A MITEL
PRODUCT
GUIDE

OpenScape Xpressions

Cluster Installation

Cluster Installation

Installation Guide
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Mitel

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Contents

Part 2- XPR Server in the Failover Cluster on Windows Server 2012 R2, 2016, 2019, 2022 and 2025

Appendices

History of Changes

Date	Changes	Reason
03/2012	First draft	
2012-06-15	Chapter 5, “Clusterintegration” and Chapter 9, “Clusterintegration” changed.	CQ00214641
2012-08-21	AxMmCtl.dll registration.	CQ00221660
2013-02-28	Section 2.3.3, “Installing Printer Embedded Codes”, on page 23 and Section 5.4.3, “Installing Printer Embedded Codes”, on page 134 updated	CQ0203098
2013-05-24	The check boxes **Enable persistent mode** and **Auto start** have been added to a dialog (see step 6 on page 37).	CQ00251261
2013-05-24	The list of supported operating system has been updated (see Section 2.1.2, “Checking the System Requirements for the Server PC”, on page 19 and Section 3.1.2, “Checking the System Requirements for the Server PC”, on page 31).	FRN5992, FRN4909
2013-10-07	Windows Server 2008 R2 SP1 Datacenter Edition is supported. However, Windows Server 2008 Datacenter Edition is not supported (see Section 2.1.2, “Checking the System Requirements for the Server PC”, on page 19 and Section 3.1.2, “Checking the System Requirements for the Server PC”, on page 31).	
2013-10-07	If you want to install the XmlApl, the IpApl or the LnApl on the cluster, execute an additional preparation step (see note in step 1 on page 70).	CQ00274817
2013-10-07	The ConnectionApl has been removed from Table 4 on page 90, “Feature Selection”, because a ConnectionApl must not be installed on a cluster.	
2014-01-02	The name “Unify” has been introduced.	
2014-05-02	If you have installed the Connection APL on a satellite computer, you cannot use the UC option of the Smart Backup & Restore feature (see below Table 5 on page 48 and below Table 13 on page 158).	CQ00289455
2014-05-07	If you use SIP in the IP APL and for voice conferences, two IP addresses are needed (see Section 4.4.15, “Voice Conferences with SIP”, on page 122).	CQ00295982
2014-05-26	Windows Server 2008 without R2 is not supported anymore. Windows Server 2012 R2 is supported. Refer to the service documentation *OpenScape Xpressions Release Notice* for details about the supported operating systems (see Section 2.1.2, “Checking the System Requirements for the Server PC”, on page 19 and Section 3.1.2, “Checking the System Requirements for the Server PC”, on page 31).	
2014-11-03	The `clusterprep.exe` file must always be executed before installing an XPR on a cluster (see step 1 on page 70).	
2014-11-03	Refer to the *OpenScape Xpressions Release Notice* for a list of the supported operating systems and Dialogic/Eicon ISDN boards (see Section 2.1.2, “Checking the System Requirements for the Server PC”, on page 19 and Section 3.1.2, “Checking the System Requirements for the Server PC”, on page 31).	
2014-11-03	Introduction of the `R:\OpenScape\xprlicsvc\` directory (see step 10 on page 59, step 2 on page 180 and step 3 on page 182)	CQ00315239

Date	Changes	Reason
2015-04-17	ADDED: Note “The XPR Reporting APL (RepApl) and the XPR Schedule APL (RepScheduleApl) should be installed on satellite(s). In case of setting up the XPR Reporting APL or the XPR Reporting Schedule APL on a satellite, the XPR must be connected to a Microsoft SQL server found on a computer outside the cluster. Please heed the notes in Section A.1, “Using a Microsoft SQL Server”, on page 303.” to Section 2.7, “Configuring XPR Services as Resources” and Section 5.7, “Configuring XPR Services as Resources”	CQ00330053
2015-04-17	REMOVED: Lines regarding XPR Reporting APL (RepApl) and XPR Schedule APL (RepScheduleApl) from tables in Section 2.7, “Configuring XPR Services as Resources” and Section 5.7, “Configuring XPR Services as Resources”	CQ00330053
2015-04-20	REMOVED: Lines regarding XPR Reporting APL (RepApl) and XPR Schedule APL (RepScheduleApl) from tables in Section 2.8.3, “Installation and Privilege Assignment of the XPR Services on the second Node” and Section 5.8.2, “Installation and Privilege Assignment of the XPR Services on the second Node”	CQ00330053
2015-09-10	ADDED: “Note Remote System Link is not compatible with [Crypt_Sec], it is designed to only work with [KRYPT].” to Section 4.1, “Installation Basics”, Section 4.3.5, “Specifying the Server Name”	CQ00333644
2017-09-22	remove Windows Server 2003 and add Windows Server 2012/2016 redesign + removal + adding chapters. Also Updating of screenshots	UCBE-12846
2017-10-26	Updated Section 9.9 Testing the XPR Server in the Cluster	UCBE-13819
2018-12-04	Updated: - Section 5.4.4 Setting System Variables on the Nodes - Section 9.4.4 Setting System Variables on the Nodes	UCBE-18240
2019-04-09	Updated: - Section 2.2 XPR Server Installation in the Cluster - Section 4.2.2.2 Installation of a CLA - Section 4.3.9 Selecting Client Components - Section 5.3 Reassignment of the Computer Name in the Registry - Section 5.7 Configuring XPR Services as Resources - Section 6.2 XPR Server Installation in the Cluster - Section 7.1.3 Checking the Windows Server 2012/2016 Settings - Section 7.2 Creating a new role for the XPR Server in the Cluster - Section 9.7 Configuring XPR Services as Resources - Section 9.3 Reassignment of the Computer Name in the Registry - Section 9.8.2 Installation and Privilege Assignment of the XPR Services on the second Node - Appendix A.1 Using a Microsoft SQL Serve - Updated all references to Dialogic/Eicon to Sangoma	UCBE-19037
2019-04-24	Updated: - Section 9.3 Reassignment of the Computer Name in the Registry - Section 9.7.2 Procedure	UCBE-19524
2019-05-22	Updated” - Section 4.2 Installing the HiPath License Management (HLM)	UCBE-19802
2025-10-24	Updated: Part 2- XPR Server in the Failover Cluster on Windows Server 2012 R2, 2016, 2019, 2022 and 2025 7.1.1 Hardware Environment at the Setup Site 8 XPR Installation on a Cluster System 9.4.3 Installing Printer Embedded Codes	

1 Preface

The OpenScape Xpressions system (XPR) is a high-performance Unified Communications system for improving the internal and external corporate communication. OpenScape Xpressions bundles messages from the most different sources via a uniform user interface and supports the user in his/her daily exchange of voice, fax and e-mail information. Calls, fax documents, e-mails, voicemails and short messages can thus be handled via a uniform interface and managed in a mailbox specific to the user.

This mailbox can be accessed flexibly via telephone or PC. A user can thus check his/her XPR mailbox in the office, from home (e.g. as a tele worker), or when on the move (on business trips, customer visits, etc.).

People who communicate mainly by means of mobile phone can use the Short Message Service (SMS) to be informed when they have new messages, to send SMS messages to a mobile phone, to divert their mobile phone to OpenScape Xpressions and to access all voice, fax and e-mail messages.

Messages in the XPR system are accessed from PCs via IMAP4 clients, or else via the MS Exchange 200x, Lotus Notes or SAP/R3 e-mail systems available at the customer facility.

The XPR system combines the following services on one Windows server platform to one Unified Communications system.

- Voicemails
- Fax
- E-mail
- SMS
- CTI
- Voice conferences
- Web conferences
- Combined voice/web conference
- Presence
- Chat

Information about the supported Windows server platforms can be found in the XPR Release Notes.

Thanks to its modular, scalable client/server architecture, this solution can be ideally configured to meet users' individual communication needs. Open standards, integration in existing data processing and telecommunications

environments, universal access to messages via PC and telephone, secure access via ISDN and/or VoIP, LAN, and intranet/internet, and the available conversion options guarantee protection of your investment in the future.

Services, user packages, data processing integration as well as software-only solutions or certified all-in systems can be implemented when required, thus creating a tailored solution for every requirement from the small entry-level variant right up to networked communication solutions.

1.1 Who should read this Manual?

This manual is intended for system administrators in charge of installing and configuring the XPR system. In order to understand the described functions and processes, the reader must have specialized knowledge in the following areas:

- Administration and configuration of the supported and deployed operating system
- Network technology
- Installation and configuration of the XPR system. This knowledge can be obtained by participating in a Unify Software and Solutions GmbH & Co. KG seminar.

1.2 Required Tools

1.2.1 Manuals

During the XPR installation and configuration the following Cycos manuals in electronic or printed format will be referred to:

- XPR Cluster Installation (this manual)
- XPRServer Installation
- XPRServer Administration
- XPRCommunications
- XPRWeb Assistant

NOTE: If you use Adobe Acrobat Reader, you can use the hotkey ALT + left arrow key to switch to the previous view and ALT + right arrow key to switch to the next view. This particularly useful for skipping back to the original passage in the text from a cross reference.

1.3 Document Conventions

Passages in the text conveying important information are indicated by striking symbols.

IMPORTANT: Such a section points to settings and processes to be performed with special care.

NOTE: Such a section marks passages in the text that contain additional notes or supplementary examples.

1.4 Acronym Directory

The following table lists the abbreviations used in alphabetic sequence.

Acronyms	Description
ACD	Automatic Call Distributor
APL	Access Protocol Layer
ASR	Automatic Speech Recognition
BRI	Basic Rate Interface
CLA	Customer License Agent
CLC	Customer License Client
CLM	Customer License Management
CLS	Central License Server
CMP	Common Management Platform
CRM	Customer Relationship Management
CSTA	Computer Supported Telecommunication Applications
CTI	Computer Telephony Integration
DTMF	Dual Tone Multi Frequency
ERP	Enterprise Resource Planning
GUI	Graphical User Inteface
HKLM	HKEY_LOCAL_MACHINE
HTTP	Hypertext Transfer Protocol
IDE	Integrated Device Electronics
IMAP4	Internet Message Access Protocol
IP	Internet Protocol
IVR	Interactive Voice Response
LDAP	Lightweight Directory Access Protocol
MWI	Message Waiting Indicator
POP3	Post Office Protocol
PRI	Primary Rate Interface
RPC	Remote Procedure Call
SCSI	Small Computer System Interface
SMS	Short Message Service
SMTP	Simple Mail Transfer Protocol
SOAP	Simple Object Access Protocol
SSDP	Smart Services Delivery Platform
TAPI	Telephony Application Programming Interfaces
TCP	Transmission Control Protocol

Table 1 Acronyms used

TTS	Text To Speech
UCC	Unified Communications and Collaboration
UM	Unified Messaging
VM	Virtual Machine
VMS	Voice Mail Server
VPIM	Voice Profile for Internet Mail
XML	Extended Markup Language
XPR	OpenScape Xpressions

Table 1 Acronyms used

1.5 Data Protection and Data Security

This system also processes and uses personal data for purposes such as billing, displays, and customer data acquisition.

In Germany, the processing and use of such personal data is subject to various regulations, including the regulations of the Federal Data Protection Law (Bundesdatenschutzgesetz = BDSG). For other countries, please follow the appropriate national laws.

The aim of data protection is to protect the rights of individuals being affected by use of their personal data.

In addition, the aim of data protection is to prevent the misuse of data when it is processed and to ensure that one's own interests and the interests of other parties which need to be protected are not affected.

NOTE: The customer is responsible for ensuring that the system is installed, operated and maintained in accordance with all applicable labor laws and regulations and all laws and regulations relating to data protection, privacy and safe labor environment.

Employees of Unify Software and Solutions GmbH & Co. KG are bound to safeguard trade secrets and personal data under the terms of the company's work rules.

In order to ensure that the statutory requirements during service – whether during "on-site service" or during "remote service" – are consistently met, you should always observe the following rules. You will not only maintain the interests of your and our customers, you will also avoid personal consequences.

A conscientious and responsible approach helps protect data and ensure privacy:

- Ensure that only authorized persons have access to customer data.
- Take full advantage of password assignment options; do not allow unauthorized persons to gain access to passwords by writing them down on a piece of paper or via other means.
- Ensure that storage media which are no longer required are completely destroyed. Ensure that no sensitive documents are left unprotected.

Prevent unauthorized persons from gaining access to data media such as tapes, CDs or DVDs or other installation media. This applies to service calls as well as to storage and transport.

Part 1- XPR Server in the Cluster on Windows Server 2008 R2

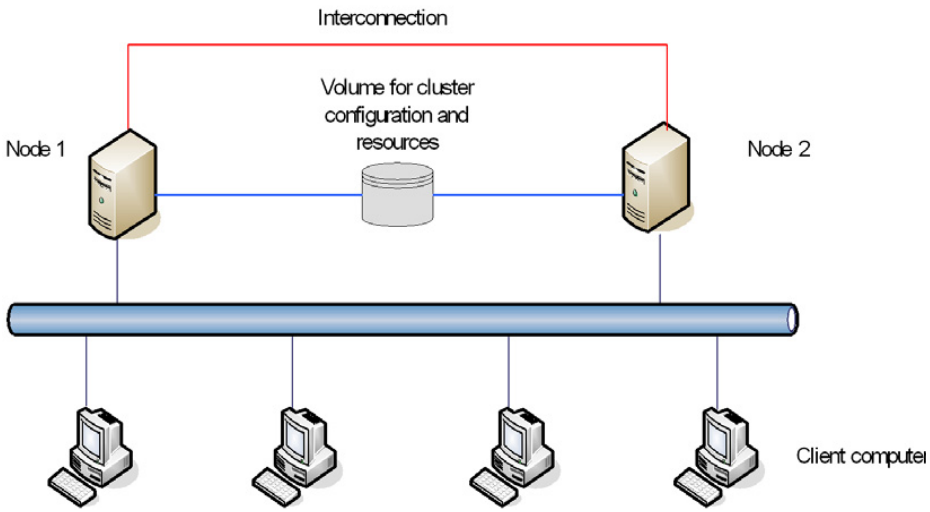
2 The XPR Server in a Cluster

NOTE: There are no screenshots for Windows Server 2012 in this documentation. The GUI of Windows Server 2012 differs from the GUI for Windows Server 2008 but the functionality is the same.

2.1 Structure of a Server Cluster

A cluster is a group of independent computer systems that are called a node and cooperate as one system. The purpose of a cluster is to provide programs and resources operated on computers of these groups with a higher availability or improved performance to minimize downtimes. There are two types of clusters:

1. In case of a performance cluster, several nodes are combined to increase the performance compared to a single server.
2. In an availability cluster, each node is able to perform the tasks of another node from the cluster if required. If a node is not available owing to maintenance work or technical failures, another node immediately takes over the tasks of the unavailable one.



2.1.1 Nodes

The term node is in this documentation exclusively used as synonym for cluster node. It is not a synonym for satellite node.

In server clusters up to eight nodes can be combined, on which the operating systems Windows operating systems are used.

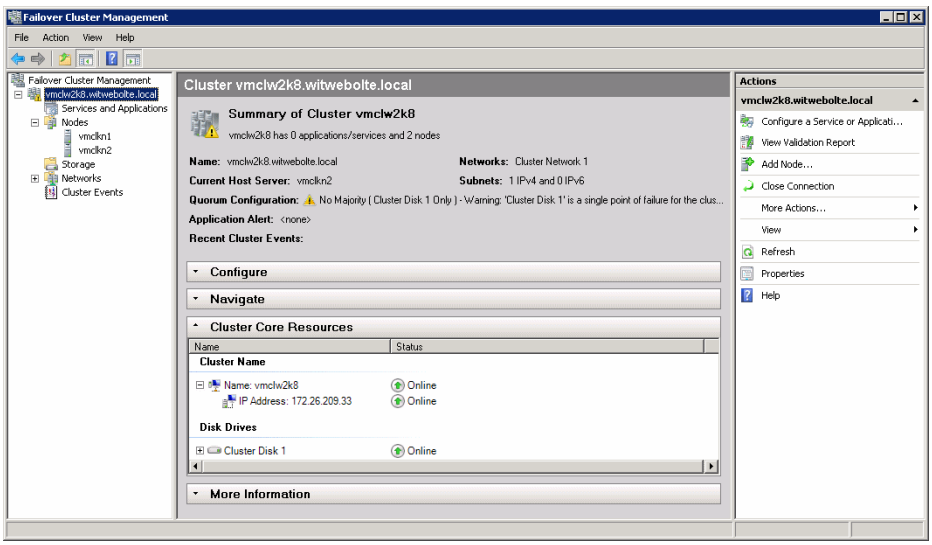
2.1.2 Client Access Point (Virtual Server)

A Client Access Point is an application, the availability or performance of which is increased by a cluster. This application is formed and identified by its IP address and network name. The IP address and the network name must be made known as resource (see Section 3.3.1, “Creating the IP Address and Network Name as Resource”, on page 39).

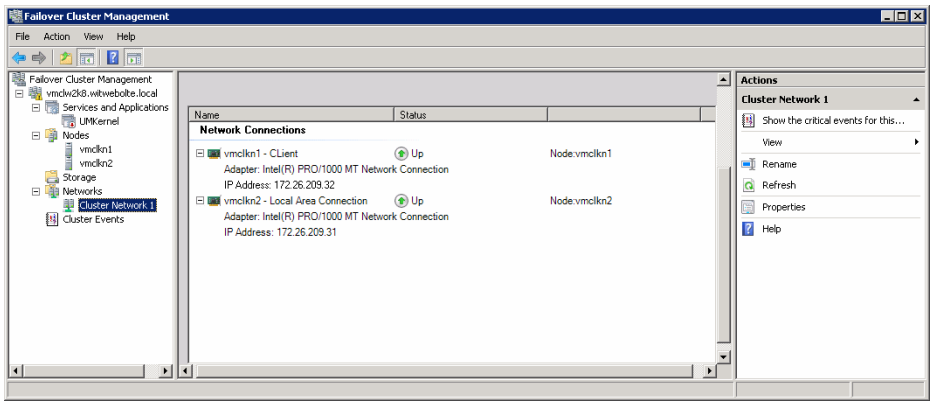
You can see a Client Access Point in the Windows Explorer under **My Network Places > Entire Network > Microsoft Windows Network > <domain name>**.

NOTE: A total of six IP addresses is important for an XPR on a Windows cluster.
- Cluster IP address (see below)
- One IP address from each of the two nodes for the internal cluster connection (Interconnect)
- IP address of the virtual server (see step 8 on page 41)
- One IP address for each of the two nodes (see below.)

When you select the cluster name in the Failover Cluster Management, the cluster IP address is displayed:



When you open **<Clustername>** > **Networks** > **Cluster Network 1** in the Failover Cluster Management, the IP addresses of the two nodes are displayed:



2.1.3 Resources

The term resource is in this documentation exclusively used as synonym for cluster resource.

Each physical or logical component of a Client Access Point the availability or performance of which is to be increased by the cluster must be configured in the Failover Cluster Management (see below) as resource. Each resource is of a type, for example

1. Physical hard disk
2. Share
3. Network name and IP address. These two resources form a Client Access Point.
4. General service

Each resource has the following properties:

1. A resource may be brought online or offline.
2. Resources may be administered in a server cluster.
3. Resources must be combined in applications (cf. Section 2.1.7, “Cluster Communication”, on page 22).
4. An application, and thus also the resources it combines, can only be assigned to one node within a cluster. If a resource of this application is brought online, it is brought online only on this node.

Resources may be used independently from each other or be furnished with dependencies, i.e. operating a resource requires the previous operation of another resource. Such dependencies affect bringing resources online and offline. Example:

A resource A depends on another resource B.

Before you can bring resource A online, resource B must therefore already be online. Bringing resource A online is otherwise not possible.

When bringing resource B offline, resource A must be brought offline first, since it depends on resource B.

The assignment of resource dependencies is mandatory, as soon as a resource directly depends on another. Even if such dependencies are not mandatory it may be useful to establish them for coupling not directly dependent resources to the functions of others.

A resource can only depend on another resource of the same application.

2.1.4 Quorum Resource

In each cluster a resource is defined as quorum resource (voting disk), with which configuration data is administered for restoring and maintaining the data integrity of the cluster. This quorum resource must provide physical memory and is therefore a physical drive in an application (quorum drive). All current cluster configuration data and information is stored on this quorum drive.

If the internal cluster connection (interconnect) is interrupted, two nodes or node groups can be separated from each other. In this situation (split-brain situation), both nodes will attempt to represent the entire cluster. But since only one node may be active, the quorum resource decides which of the two nodes is assigned the resources.

If a node is changed (cf. Section 2.1.9, “Failover and Failback”, on page 22), the first entity of the Failover Cluster Management will first store all necessary information on the management's drive. Not until then the node is changed and the second entity of the Failover Cluster Management reads the current configuration data from the quorum drive and reboots the resource.

2.1.5 Applications

An application combines several resources into larger logical units. Typically, the resources of a Client Access Point are combined into an application, but it is not mandatory. Such applications define the units for a failover or failback (cf. Section 2.1.9, “Failover and Failback”, on page 22). If one of the resources fails, the cluster service automatically shifts all resources to another node and reboots them there.

An application may only be assigned to one node each, and a single resource only to one application. Such relations ensure all resources of an application to be always active on the same node.

NOTE: Besides the application for the XPR server, further applications, for example for an Exchange server, may exist. We do not recommend this, though.

2.1.6 Cluster Service and Cluster Manager

On each node operates a cluster service that controls all node, application and resource functions within the cluster and communicates with the cluster services of all further nodes. In combination with other components such as cluster network driver, cluster harddisk driver, resource monitors, etc., the cluster service forms the cluster manager.

2.1.7 Cluster Communication

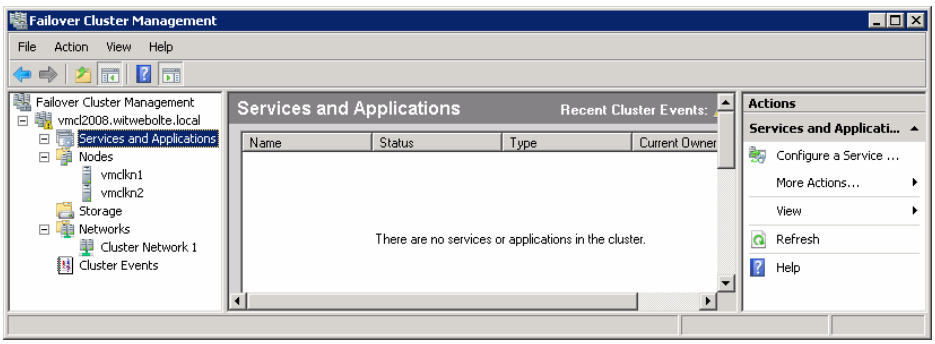
All nodes are interconnected via one or several, physically independent network connections. Via this connection the nodes exchange special messages with which the resource transmission can be triggered at a specific time. Communication with the client network is enabled via a network interface separated from the interconnect connection.

Each node can access the storage devices, which are protected from failures of single disks by RAID. Such data carriers hold the entire resource and configuration data of the cluster. In this way, each node is given access to the entire data of the cluster configuration.

Only one entity of the Failover Cluster Management can access a data carrier though. If no hardware failures occur, possession of a data carrier may be automatically (for example in case of an error) or manually (for example in case of maintenance) be transferred to another entity.

2.1.8 Cluster Administration

The nodes are administered by a central computer using cluster administration software (Failover Cluster Management). This software is operated either on one of the nodes or on another computer outside the cluster and can administer the single nodes remotely.



2.1.9 Failover and Failback

If an error occurs with a resource in a server cluster, the cluster service will first attempt to reboot the resource on the same node. If this attempt fails, the application's resources are shifted to another node within the server cluster and rebooted there. In this process, all resources are first brought offline on the first node. Then, the application is shifted to the second node and subsequently be brought online again under consideration of the set dependencies. This process is called failover.

If a node on which resources are active becomes inactive, the cluster service performs a failover and transfers all applications and resources to another node. When the node originally used is active again, the cluster service can perform an automatic failback.

All resources can be set in a way that they can trigger a failover if they close down themselves a specific number of times within a specific period owing to an error. This setting, however, is only required for the most important resources, the kernel resources. Other, less important resources should not be allowed to trigger a failover. Which resource is a kernel resource depends on the priorities of a cluster installation's operator. Our recommendation is that the following resources are kernel resources:

- Resource of type **IP Address** (see step 9 on page 41)
- Resource of type **Network Name** (see step 9 on page 41)

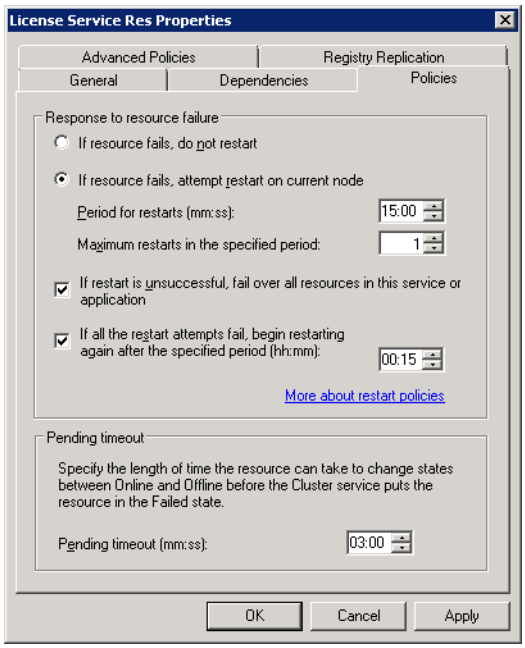
NOTE: These two resources form the Client Access Point.

NOTE: The cluster drive (Cluster Disk 2) need not be separately listed since the resources of type IP Address and Network Name depend on the cluster drive. Consequently, if the cluster drive fails, a possible failover is triggered by the resources of type IP Address and Network Name and not by the cluster drive.

- Resource of type **File Server**, which represents all network shares (see step 5 on page 151)
- XPR License Service (licsvc) (see step 13 on page 166)
- XPR Name Locator (nameloc) (see step 22 on page 169)
- XPR Configuration Service (cgfsvc) (see step 22 on page 169)
- XPR Status Dispatcher (xmrsvc) (see step 22 on page 169)
- XPR Information Store (infostor) (see step 22 on page 169)
- XPR Message Router (mta) (see step 22 on page 169)
- XPR Administrator (mrs) (see step 22 on page 169)

Please check with the cluster installation operator to define how often a resource must fail and the period in which such failures occur until a failover is triggered. These specifications will later be required when you configure the resources.

The License Service configuration (see step 13 on page 166) may serve as example here:



If the **If resource fails, attempt restart on current node** radio button is active in the **Response to resource failure** section and the resource is not operating anymore, the attempt is made to reboot it.

The **Period for restarts (mm:ss)** and **Maximum restarts in the specified period** fields specify the framework conditions for this. The **Period for restarts (mm:ss)** field indicates the time span in which attempts are made to automatically start the resource, and the **Maximum restarts in the specific period** field specifies the maximum number of such attempts made within the given period. If, for example, the **Maximum restarts in the specified period** field has value `3` and the **Period for restarts (mm:ss)** field value `15:00`, a maximum of three attempts is made within 15 seconds to automatically restart the resource.

The **If restart is unsuccessful, fail over all resources in this service or application** check box specifies what happens if the service could not be rebooted after the number of attempts given in the **Maximum restarts in the specified period** field within the **Period for restarts (mm:ss)**. With this check box being active, a failover of the application is attempted for the XPR.

2.1.10 Continuative general Information about Server Clusters

You find continuative general information about the server cluster topic in the Windows product documentation or in the TechNet section at the Microsoft Website.

2.2 XPR Server Installation in the Cluster

When installing the XPR server in the cluster, some specials must be considered:

1. The XPR server in a cluster is always operated in an availability cluster, i.e. always only one node may operate as XPR server.
2. Setting up a server cluster is not part of this documentation and incumbent on the customer prior to the XPR server installation. Therefore, please consult the network administrator or IT department in time for clarifying the necessary requirements on the IT systems and the technical options before the installation (cf. Section 2.1, “XPR Server Pre-installation Checklist”, on page 17).
3. During the setup, the XPR server configuration and different resources must be replicated to any further node of the cluster. This process requires single nodes to be brought offline during the installation, respectively single server services to be temporarily deactivated. Therefore verify that the ongoing operation is not imperiled by the setup routine.
4. For availability reasons, some XPR server system components that can be locally installed in case of a single installation may not be installed on one of the nodes but must be stored on one or several satellite systems.

   a) Some XPR components must not be installed on a Windows cluster (see the end of Section 5.7.1, “Overview”, on page 152). These components must be installed on one or several redundant satellite systems.

   An IP APL can be operated in parallel to an ISDN APL on one computer.

   b) All external additional components such as client modules, interfaces, etc. must not be selected for installation on the cluster, but are installed on satellite systems.
5. The XPR server setup in the cluster requires some components to be executed respectively installed locally on each node and such nodes to be rebooted during the installation. Therefore, verify in the run-up to the installation,

   a) that you can directly access the single nodes,

   b) that you can connect a setup medium to the nodes or that the nodes can access the installation data via the network,

   c) that each node on which the XPR server is to be installed can be rebooted in the ongoing operation without interrupting the ongoing cluster operation.
6. On the two cluster nodes the following programs may be locally installed on the nodes but not on the cluster:

a) Client License Management (CLM)

b) Crystal Reports

IMPORTANT: Please note that a license must be purchased for each node.

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c) Business Intelligence and Reporting Tool (BIRT)

d) Text-To-Speech (TTS)

e) Automatic Speech Recognition (ASR)

NOTE: TTS and ASR have been released only for specific operating systems and only on real hardware or on VMware ESX 4.0. Please refer to the OpenScape Xpressions Release Notice to see which operating systems have been released.

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f) Application Builder

7. The following programs or services can be installed neither on the cluster nor locally on the node:

   a) Connection APL

      - UCC
      - Web conference server
      - PostgreSQL database
      - Microsoft SQL Server 2005 Express
      - optiClient 130 Web

   b) Smart Services Delivery Platform (SSDP; see the directory XpressionsInstall\`AddOn\Misc\SSDP\` on the setup medium)

8. Table 12 on page 154 shows the XPR services that are mandatory in every XPR server in the cluster or are available optionally.

IMPORTANT: Please note that in this table we differentiate the services as regards general and limited availability (see also the note that precedes Table 12 on page 154).

Table 13 on page 158 shows the XPR services that cannot be installed on a Windows cluster.

IMPORTANT: All APLs mentioned neither in Table 12 on page 154 nor in Table 13 on page 158 may only be installed on the cluster after a project-specific release.

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9. If you do not perform the application conversion with Ghostscript but with Microsoft Office, you need to install Microsoft Office on both nodes. Please remember that you need two licenses for this purpose. Please also note the information about the application conversion with Microsoft Office in the OpenScape Xpressions *Server Administration* manual.

3 Initial-Installation Preparations

3.1 XPR Server Pre-installation Checklist

Step
1. Section 3.1, “XPR Server Pre-installation Checklist”, on page 29
2. Section 3.2, “Creating an Application for the XPR Server in the Cluster”, on page 37
3. Section 3.3, “Specifying new Resources for the XPR Server in the Cluster”, on page 39

Topic	Description
Information to be provided by the customer:	
IP settings	Address, gateway, DNS server, and possibly the VoIP servers' addresses
Passwords	Local and Domain.
Fax document type	Which document types are sent by fax (suitable conversion software to be provided)?
Numbering plan	The numbering plan agreed with the customer must be available.
Cluster system check before installing the software:	
Hardware	The hardware used must have been tested and released by the producer of the operating system. Please read the note for this in Section 3.1.1, “Hardware Environment at the Setup Site”, on page 30. Remove superfluous hardware from the server PC (e.g. sound cards).
Operating system (Configuration)	See Section 3.1.3, “Checking the Windows Server 2008 Settings”
LAN integration	Verify that the server PC is correctly integrated into the customer LAN.
Cluster preparation	Check whether the resources (IP address and network name) already exist for the XPR server to be installed. If not, define these new resources after consulting the network administrator (see Section 3.3, “Specifying new Resources for the XPR Server in the Cluster”, on page 39).
Miscellaneous	Before the software installation, shut down all applications running in the background (for example antivirus programs). After the successful installation such applications can be rebooted.

3.1.1 Hardware Environment at the Setup Site

IMPORTANT: The hardware used must have been tested and released by the producer of the operating system. You find information about tested and released hardware under the following address:

http://www.windowsservercatalog.com/default.aspx

Follow here the link **Cluster Solutions** in the **Hardware testing status** column.

Before the actual implementation begins, make sure that the required hardware environment is available on site. This comprises:

- A Windows Server-2003/2008 cluster system with a least two nodes, previously installed by the customer and ready for operation.
- Access to an administration station for the cluster system
- Wired LAN sockets and LAN wires
- Additional network connections 230V (USA: 110 V) for additionally required hardware, such as a protocol tester or an external setup medium.

You find details on implementing and assembling the communication system on a satellite system in the respective service manual.

3.1.2 Checking the System Requirements for the Server PC

IMPORTANT: The installation in the cluster system requires the necessary communication hardware to be installed on the Windows cluster or on a satellite system.

Please note that we differentiate between general and limited availability, as is also outlined in point 8 on page 27 and described in detail in Table 4 on page 44.

PC Hardware/Software (New Installations)

The following minimum requirements should be met:

- **Processor**
  - Intel Pentium 4 (or compatible) (Xeon processor and dual-core system), at least 2 GHz
- **Working memory**
  - 2 GB (recommendation: 4 GB)
  - in case of TTS usage
    - additional 100 MB per installed TTS voice of Nuance Vocalizer for Networks 5 and
    - additional 2MB per channel

    at least, however, additional 1024 MB
  - in case of ASR usage 512 MB in addition
- **Hard disks**

  2 hard disks, each of them with at least 100 GB on cluster drive

IMPORTANT: Be sure that the partition on which the XPR server software is installed has a minimum size of 10 GB. The target path must not contain any blanks (e.g. r:\OpenScape Xpressions\xpr)!

- **Data availability**

  It is in most cases available as RAID drive in the cluster.

IMPORTANT: A cluster is no replacement for a data backup. We urgently recommend to fully integrate the cluster in a data backup strategy.

- **USB connection**

  It serves for installing the OpenScape Xpressions system from an alternative setup medium, for example an external harddisk.

- **LAN**

  Ethernet 100 Base T or Gigabit

  - The network board must be connected with the LAN to ensure trouble-free XPR server booting.
  - The network board settings must correspond to those of the router/HUB.
  - An MS Loopback Adapter must have been installed (see OpenScape Xpressions *Server Installation* manual).

IMPORTANT: When replacing the network board or modifying the configuration (hardware), the MAC-ID used must be checked as it may have changed and a new license file may have to be created. In this case, the old MAC ID is disabled and no further license files may be generated for this MAC ID. Likewise, the licenses for this MAC-ID can no longer be extended.

- **Operating systems**

  Refer to the service documentation *OpenScape Xpressions Release Notice* for details about the supported operating systems.

- **Protocol stack**

  Correctly configured TCP/IP protocol stack

IMPORTANT: The installation of an XPR system on substituted drives is not possible, since the setup program cannot create the required directory shares of the XPR system.

IMPORTANT: Installing the XPR system on a domain controller is not permitted.

IMPORTANT: You may not set up an XPR on a computer on which a ComAssistant is installed. In this context it is irrelevant whether or not the XPR is integrated in the ComAssistant.

Sangoma ISDN boards

IMPORTANT: Please note that we differentiate between general and limited availability, as is also outlined in point 8 on page 27 and described in detail in Table 4 on page 44.

IMPORTANT: At times, Sangoma uses different version numbers for the same board. For example, the hardware description features a specific version number for a board, but in the Sangoma Diva Configuration Manager you find another version number for the same board. The version numbers used for Sangoma ISDN boards in this XPR V7 guide are always the version numbers specified in the Sangoma Dive Configuration Manager!

Refer to the *OpenScape Xpressions Release Notice* for a list of the supported Sangoma ISDN boards.

The following Sangoma ISDN PRI boards of version 2.0 are supported for upgrades only. The corresponding drivers do not support voice conferences. These Sangoma ISDN PRI boards of version 2.0 are not supported by the drivers (version 8.5.7) on the XPR V7 setup medium. **The drivers on the XPR V7 setup medium must not be installed when Sangoma ISDN PRI boards of version 2.0 are used!**

- Diva PRI/E1/T1 boards (version 2.0)
  - Diva PRI/E1/T1-8 PCI
  - Diva PRI/E1-30 PCI
  - Diva PRI/E1-30 PCIe
  - Diva PRI/T1-24 PCI
  - Diva PRI/T1-24 PCIe

Mixed operation between different BRI or PRI cards as well as mixed operation of BRI and PRI cards on a server computer is not released.

IMPORTANT: Using more than 3 Sangoma-4BRI boards in the CorNet-T context may lead to a faulty call forwarding connection.

3.1.3 Checking the Windows Server 2008 Settings

- **Computer name**

  IMPORTANT: The name of the computer on which the XPR is installed must not exceed 15 characters.

- **Harddisk configuration**

  You perform the cluster installation of the XPR software on a cluster drive. Verify that the available disk size of the cluster drive is at least 10 GB. On this drive, the XPR software, user data and mailboxes are used and it stores the system and registry data required for replicating the cluster system.

  Verify that the partition is an NTFS partition, so that the enhanced security mechanisms and the scalability can be used.

- **Windows DHCP service**

  This service is usually not installed on Windows Server 2008 R2 and Windows Server 2012 R2. If it is installed, uninstall it under **Start** > **Settings** > **Control Panel** > **Programs** > **Programs and Features** > **Turn Windows features on or off** > **Remove Feature** > **Remote Server Administration Tools** > **Role Administration Tools** > **DHCP Server Tools**.[1]

- **SMTP service**

  Remove the SMTP service of Windows because the XPR server offers its own SMTP connection that conflicts with the Windows service. Uninstall the service via **Start** > **Settings** > **Control Panel** > **Programs** > **Programs and Features** > **Turn Windows features on or off** > **Remove Feature** > **SMTP Server**.[1]

- **Internet Information Server (IIS)**

  This service is usually not installed on Windows Server 2008 R2 und auf Windows Server 2012 R2. If it is installed, uninstall it under **Start** > **Settings** > **Control Panel** > **Programs** > **Programs and Features** > **Turn Windows features on or off** > **Remove Feature** > **Remote Server Administration Tools** > **Role Administration Tools** > **Web Server (IIS)Tools**.[1]

1. If you have set the classic Control Panel view the following path applies:
Start > **Settings** > **Control Panel** > **Adminstrative Tools** > **Server Manager** > **Features** > **Remove Feature** > ....

- **Network integration**

  The LAN connection of the computer on which the XPR system is to be installed must be established **before** the XPR software setup, since otherwise the network services cannot be started by the operating system.

  When you replace a network adapter, a new license must be created for the MAC address of the new network adapter. The MAC address of the old network must be known as well for this purpose.

- **DHCP client**

  Stop and deactivate the **DHCP Client** in the service management via **Start > Programs > Administrative Tools > Services**.

- **Antivirus software**

  To avoid installation errors, deactivate the antivirus software during the installation.

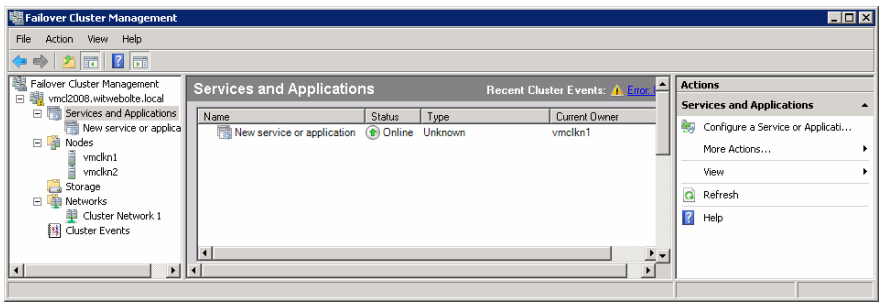
- **License logging**

  Stop and deactivate the service **License Logging** in the service management via **Start > Programs > Administrative Tools > Services**.

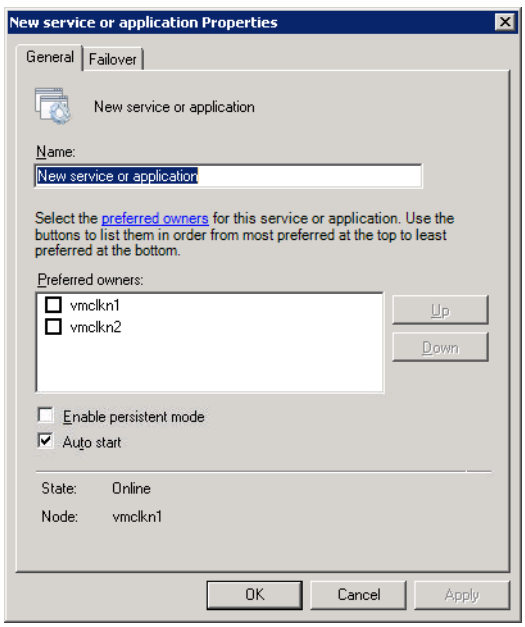
3.2 Creating an Application for the XPR Server in the Cluster

Please ask the network administrator in charge for the cluster name of the XPR server to be installed.

1. In the Failover Cluster Management rightclick on **Services and Applications**.
2. Select **More Actions...** > **Create Empty Service or Application**.



3. Rightclick the newly created entry and select **Properties**.

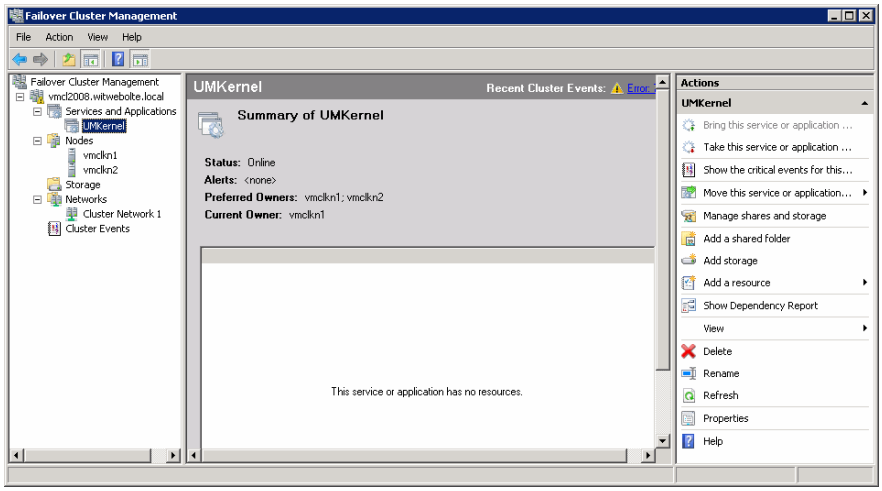


4. Enter a name for the application in the **Name** field, for example `UMKernel`.
5. In the **Preferred owners** field activate the nodes on which the XPR is to operate at a later date.
6. Leave the **Enable persistent mode** check box deactivated and the **Auto start** check box activated.

   If the **Enable persistent mode** check box is activated, this remembers the last node the administrator onlined a group on or moved a group to. The group will be hosted on this “default” node on next cluster cold start.

The **Auto start** check box determines, if a group will start automatically when starting a cluster or recovering a cluster after a failure.

7. Click on **OK**.



3.3 Specifying new Resources for the XPR Server in the Cluster

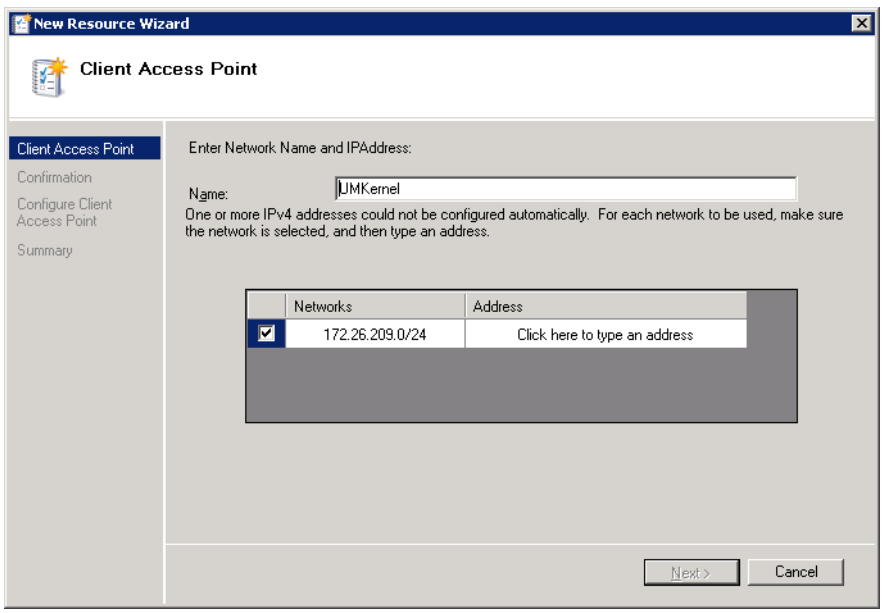
Please contact the network administrator in charge to be given the IP address and network information of the XPR server to be installed.

3.3.1 Creating the IP Address and Network Name as Resource

If the network administrator has already defined an IP address and a network name for the XPR server in the cluster, you can skip this section and continue with Section 3.3.2, “Testing the new IP Address and Network Name in the Cluster System”, on page 46. If no IP address and network name have yet been defined for the XPR server in the cluster, you need to execute steps 1 on page 39 to 9 on page 41 described in the following.

A new resource of type IP address is necessary to create together with a resource of type network name a virtual server on which XPR runs. This virtual server makes network access to XPR available.

1. In the Failover Cluster Management, rightclick the application created in Section 3.2, “Creating an Application for the XPR Server in the Cluster”, on page 37 for the XPR server.
2. Select the menu option **Add a resource** > **1 - Client Access Point** in the context menu.



3. Set the **Name** field to the network name of the virtual server. The field is allocated with the application name. Change the name to prevent application names and network names from getting confused (example: `UMKernelServer`).

IMPORTANT: The name must not exceed 15 characters.

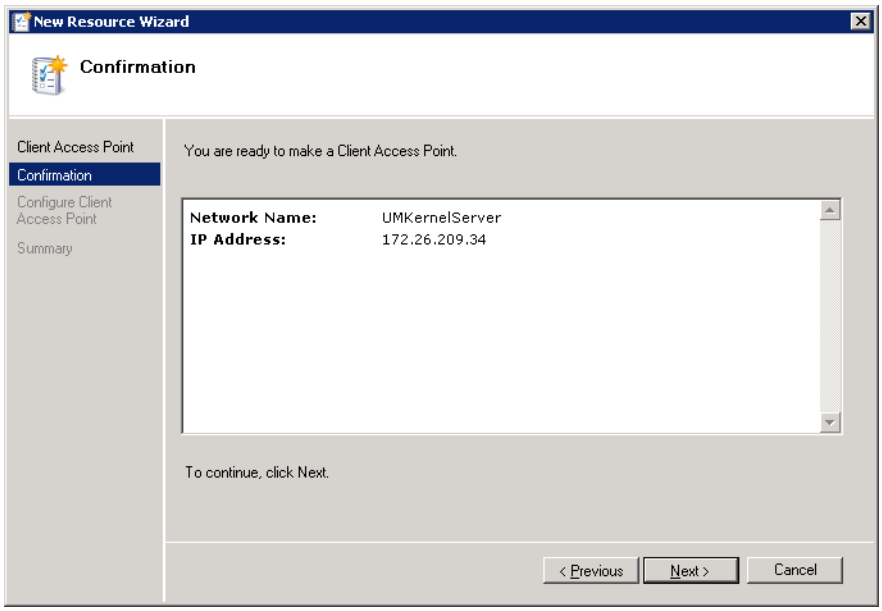
---

4. Click on **Click here to type an address**.
5. Enter the IP address of the application or of the virtual server.

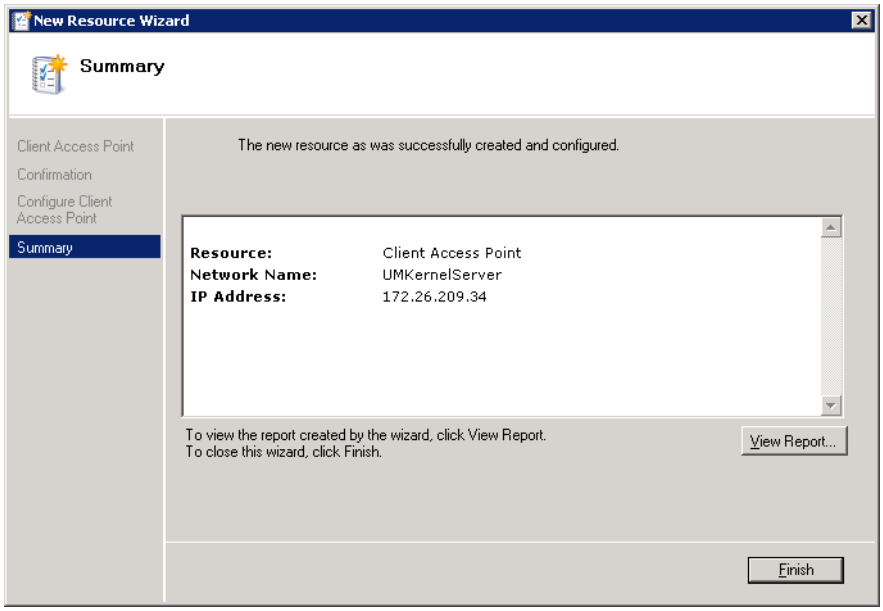
IMPORTANT: Do not enter the IP address of the cluster (see Section 2.1.2, “Client Access Point (Virtual Server)”, on page 18).

---

6. Click on **Next >**.

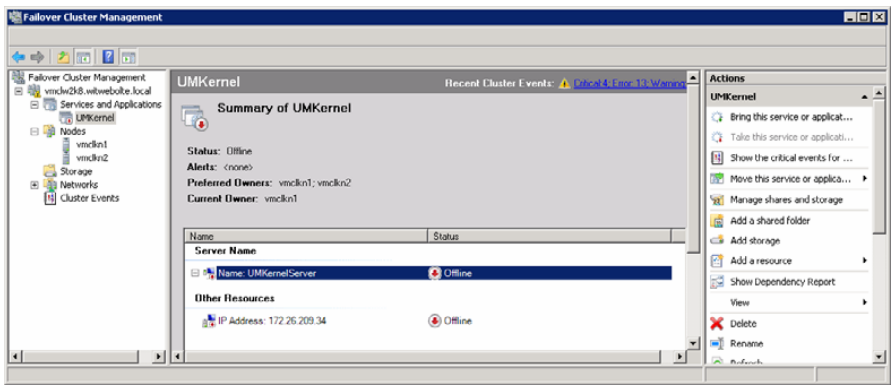


7. Click on **Next >**.

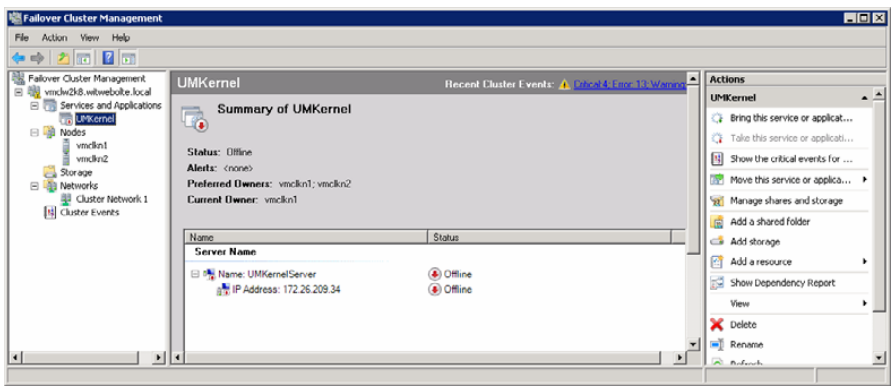


8. Click on **Finish**.

9. The middle section of the Failover Cluster Management shows now the just created resources:



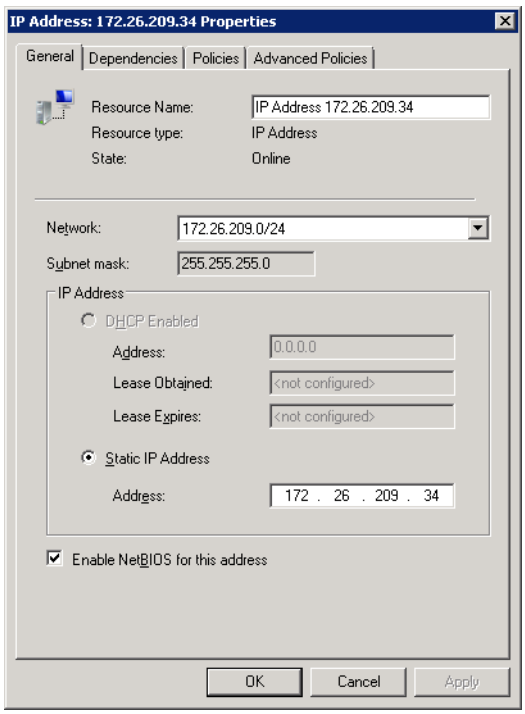
The way in which the two resources of type IP Address and Network Name are represented changes as follows:



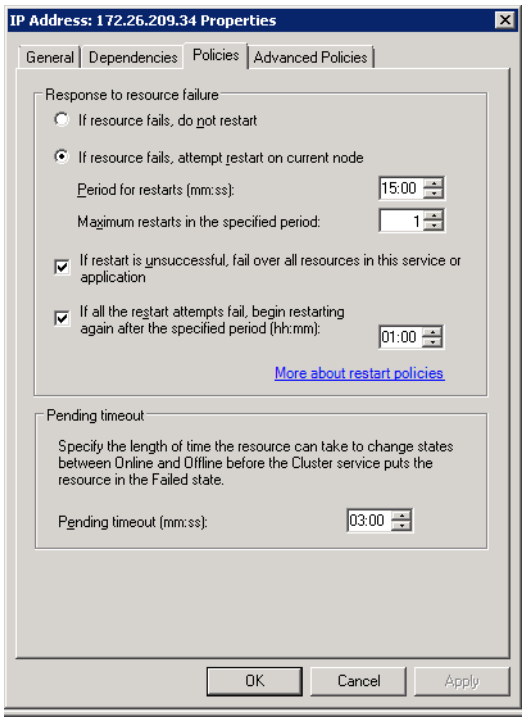
These two resources were created in the application in which the XPR server is to be installed. When the two resources are brought online, the virtual server of this application appears in the Windows Explorer under **Network** > **<network name>**.

10. Execute the following substeps to configure a failover initiation by the resource of type IP Address.

    a) Rightclick the resource **IP Address: <IP address>** and select **Properties**.



    b) Click on the **Policies** tab.

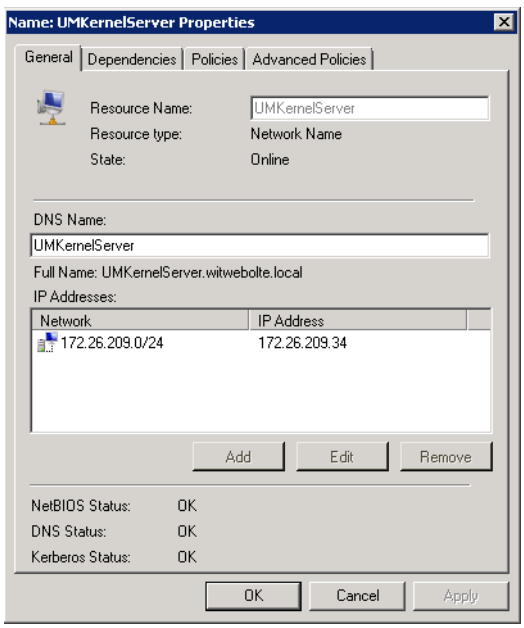


c) Perform the settings according to the description in Section 2.1.9, “Failover and Failback”, on page 22.

d) Click on **OK**.

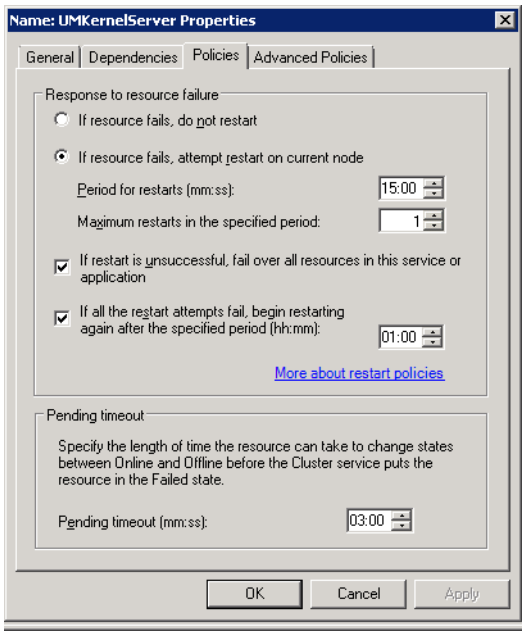
11. Execute the following substeps to configure a failover initiation by the resource of type Network Name.

    a) Rightclick the resource of type **Name: <network name>** and select **Properties**.



    NOTE: On the **Dependencies** tab you can see the dependency of this resource on the resource of type IP Address, which was entered automatically.

    b) Click on the **Policies** tab.



c) Perform the settings according to the description in Section 2.1.9, “Failover and Failback”, on page 22.

d) Click on **OK**.

3.3.2 Testing the new IP Address and Network Name in the Cluster System

Testing the IP address

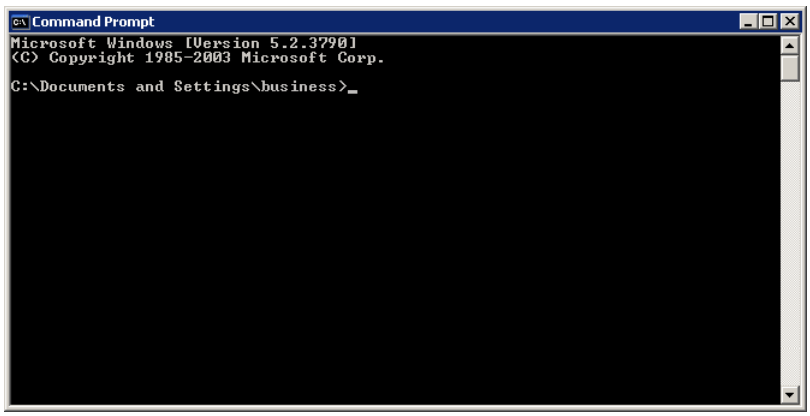
1. In the Failover Cluster Management rightclick the previously created resource **IP Address: <IP address>** *a*nd select the menu option **Bring this resource online** from the context menu.

   In the middle section of the Failover Cluster Management the value in the **Status** column must change to **Online** after a short period for the selected IP address.

2. Execute the following substeps to ping this address for testing the availability of the IP address in the network.

   a) Click on **Start > Programs > Accessories > Command Prompt**.

   b) or click on **Start > Run** and enter the **cmd** command in the **Open** field.



3. Enter the command `ping xxx.xxx.xxx.xxx` in the command line. `xxx.xxx.xxx.xxx` is here the wildcard for the previously specified IP address of the XPR server in the cluster system to be installed (see step 5 on page 40).

4. If the server in the cluster system does not respond to the ping command, make sure that all requirements (Section 3.1, “XPR Server Pre-installation Checklist”, on page 29) have been met, check your settings once again, or contact the network administrator in charge. Otherwise, continue with the next step.

5. Return to the Failover Cluster Management.

Testing the network name

6. In the middle section of the Failover Cluster Management, rightclick in the **Server Name** category the entry **Name: <network name>** .
7. Select the **Bring this resource online** option from the context menu.

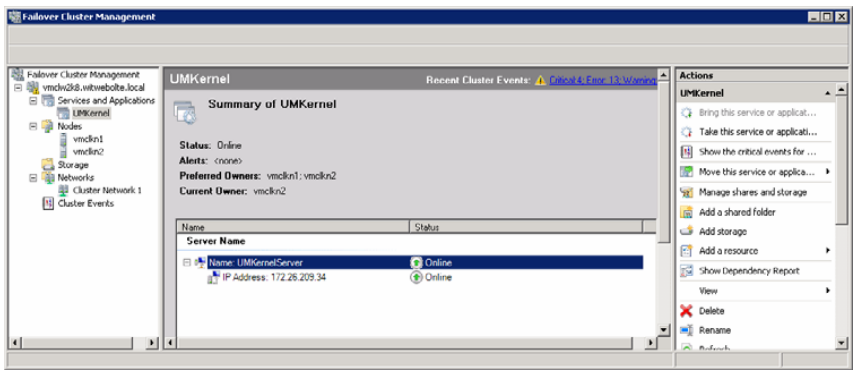
   In the middle section of the Failover Cluster Management, the value in the **Status** column for the **Name: <network name>** resource must change to **Online** after a short period.
8. Perform a changeover of the cluster to another node.

   a) In the left-hand section of the Failover Cluster Management, rightclick the application for the XPR server to be installed.

   b) Select the menu option **Move this service or application to another node** > **Move to node <name of the second node>** from the context menu.

   c) Click on the **Move <application name> to <name of the second node>** button.

   In the middle section of the Failover Cluster Management, the value in the **Status** column for the selected Client Access Point must change to Online after a short period. After this change, the network name of the second node must be the value for **Current owner**.



9. Enter the command `ping xxx.xxx.xxx.xxx` in the command line once more. `xxx.xxx.xxx.xxx` is here the wildcard for the previously specified IP address of the XPR server in the cluster system to be installed (see step 5 on page 40).
10. Make sure that the server in the cluster system responds to the PING command, otherwise check your settings once again or contact the network administrator in charge.
11. In the left-hand section of the Failover Cluster Management, rightclick the application for the XPR server to be installed.

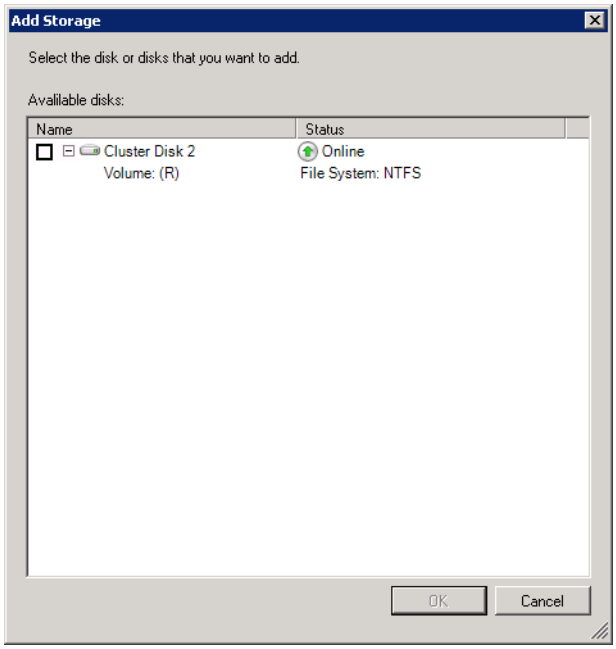
a) Execute the command **Move this service or application to another node** > **Move to node <name of the first node>** to switch back to the first node.

b) Click on the **Move <application name> to <name of the second node>** button.

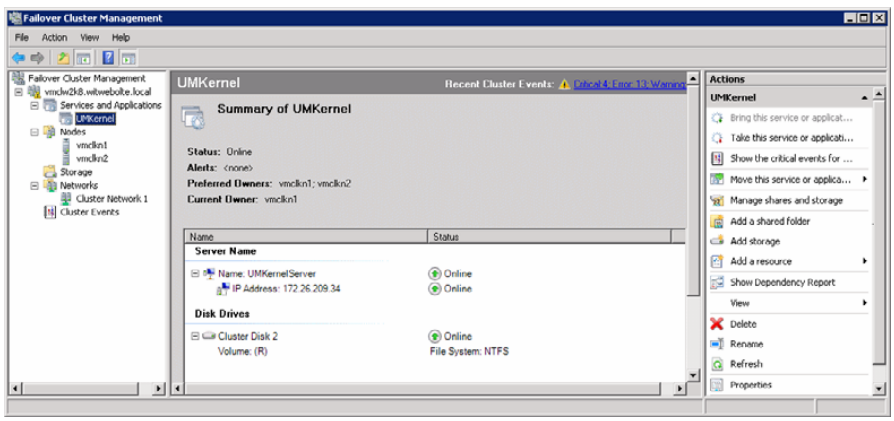
NOTE: If this test fails, verify that all requirements (Section 3.1, “XPR Server Pre-installation Checklist”, on page 29) have been met, check your settings once again or contact the network administrator in charge. If this test is successful, you can continue with the next preparation step.

3.3.3 Creating a Cluster Drive

1. In the left-hand section of the Failover Cluster Management, rightclick the application for the XPR server to be installed.
2. Select **Add storage**.
3. Activate the check box of the offered cluster disk.

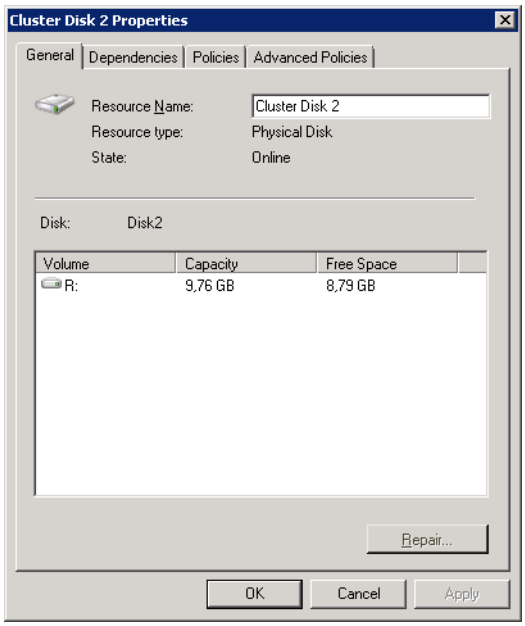


4. Click on **OK**.

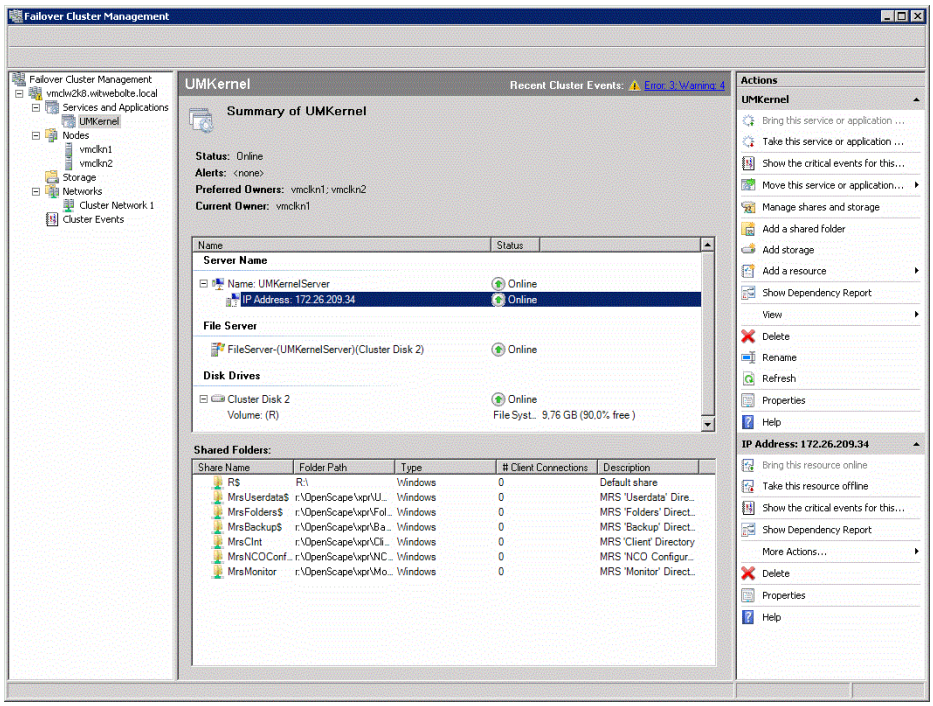


The Failover Cluster Management now shows the created cluster drive as resource. It contains typically drive letter `r`.

The type of this resource is **Physical Disk**.


Cluster Disk 2 Properties
General
Dependencies
Policies
Advanced Policies
Resource Name:
Cluster Disk 2
Resource type:
Physical Disk
State:
Online
Disk:
Disk2
Volume
Capacity
Free Space
R:
9,76 GB
8,79 GB
Repair...
OK
Cancel
Apply

4 XPR Installation on a Cluster System



This chapter describes step by step the initial installation of an XPR system on a cluster system. Use the following checklist (cf. Section 3.1, “XPR Server Pre-installation Checklist”, on page 29) to ensure that the requirements to install XPR have been met.

NOTE: Before you start the insatllation, please read the information in Chapter 2, “Structure of a Server Cluster”.

Before starting an installation check in g-DMS if the current version of the Release Notice and the Release Notes are available.

The following tables reflect the product structure in G-DMS / SWS (Software Supply Server) and the diagnostics structure in ICTS (Case Tracking System):

Main Category	Applications
Product Family	OpenScape Xpressions
Product	OpenScape Xpressions
Product Version	OpenScape Xpressions V7
Product Code	P30152-P1526-A1

Tabelle 2 Product Structure in G-DMS / SWS

Product Family	Applications
Product Group	OpenScape Xpressions
Product Type	OpenScape Xpressions
Product Version	V7
SW Version	V7 R5

Tabelle 3 Diagnostic Structure in the ICTS

Installation Checklist

Before you start the installation, the steps listed in the table must all be performed.

Step
1. Section 3.1, “XPR Server Pre-installation Checklist”, on page 29
2.Section 3.1.2, “Checking the System Requirements for the Server PC”, on page 31
3.Section 3.1.3, “Checking the Windows Server 2008 Settings”, on page 35

Tabelle 4

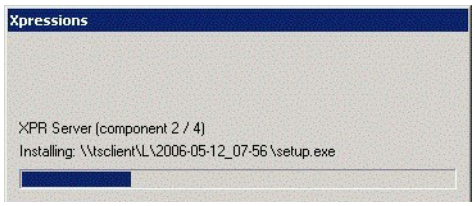
4.1 Installation Basics

The product installation does not only include the actual XPR server, but also components that are no primary XPR server elements. Such elements are installed as independent products. The product installation comprises among other things:

- further server components
- additional language packets (for example English, French, Spanish, Italian)
- client applications (e.g. Application Builder)
- drivers for ISDN hardware and connection to PBX
- components for text-to-speech
- Acrobat Reader to display product documentation
- Automatic Speech Recognition (ASR)

When you connect the setup medium to the computer, an installation program starts in which you need to make some specifications and select the components to be installed. This program will be called **Wrapper** in the following.

After you have made all necessary specifications and selected the desired components, the Wrapper starts automatically and in succession the installation programs of the selected components. During this phase the following status dialog appears in the top left corner of the screen:



This dialog displays the following information:

- Number of components to be installed
- Number of components already installed
- Status of the entire installation

The number of components which you can select in the Wrapper depends on the licenses you have purchased. Some of the components installation programs prompt you to make further entries by appropriate dialogs.

`The computer may only be rebooted, if you are prompted to do so by the following dialog:`

After the installation you have an operable but vastly unconfigured XPR system. During the installation only those components are configured that cannot work without an initial configuration. Among these components you find:

- SMTP APL
- LDAP APL

IMPORTANT: The XPR server must not be installed on the domain controller.

NOTE: Remote System Link is not compatible with [Crypt_Sec], it is designed to work only with [KRYPT].

4.1.1 Overview of the Installation Process

The following list shows the installation sequence and refers to the corresponding text passages.

Step
1. Section 4.3.4, “Installing/Connecting the License Service”, on page 78
2.Section 4.3.5, “Specifying the Server Name”, on page 82
3.Section 4.3.6, “Selecting the Server Languages and the Default Language”, on page 84
4.Section 4.3.7, “Confirming the Release Notes”, on page 85
5.Section 4.3.8, “Selecting System Components”, on page 87
6.Section 4.3.9, “Selecting Client Components”, on page 88
7.Section 4.3.10, “Selecting External Software”, on page 89
8.Section 4.3.11, “Installing Acrobat Reader”, on page 90
9.Section 4.3.12, “Installation Type for the automatic Speech Recognition”, on page 91

Tabelle 5

4.2 Installing the HiPath License Management (HLM)

The CLC (Customer License Client); XPR License Service; licsvc) is a DLL and the XPR server element via which the XPR server can query the CLA (Customer License Agent) for an available valid license through an encrypted IP connection. The CLM (Customer License Management) is a central GUI from which you control the connected CLAs for activating and monitoring licenses. CLM and CLA form the most important HLM software components. Using the HLM, licenses for products of the Unify Software and Solutions GmbH & Co are thus centrally and provided in a network.

You find detailed information about the functionality and installation of the CLM i the XPR Server Installation manual.

You can also obtain continuative information from the http://apps.g-dms.com:8081/techdoc/search_en.htm

Internet (Intranet) page. Select the **License Management** product and click on the **Create list** button.

The following scenarios can be conceived for the HLM and clustered XPR:

IMPORTANT: When you select your scenario make sure that licenses are always bound to the MAC ID of the computer on which the CLA is installed and operates.

Scenario 1: CLM and CLAs outside the cluster nodes

CLM and CLA are installed on neither of the two cluster nodes. This can be considered the scenario most commonly used. You find detailed information about the functionality and installation of the CLAs for this scenario in the XPR server installation manual.

Scenario 2: CLAs on the cluster nodes

One CLA is installed on each cluster node. The CLAs are installed locally, thus not in the cluster context. The CLM is installed on another computer in the network. The CLA installation for this scenario is described in section “Installation of the CLAs on the Cluster Node”.

Scenario 3: CLM and CLAs on the cluster nodes

One CLA is installed on each cluster node and the CLM is installed on one of the cluster nodes. This scenario is not supported.

XPR Installation on a Cluster System
Installing the HiPath License Management (HLM)

4.2.1 Installation of the CLAs outside the Cluster Nodes

You find detailed Information about the functionality and installation of this scenario in the XPR Server Installation manual.

4.2.2 Installation of the CLAs on the Cluster Node

IMPORTANT: Before you begin with the installation, deactivate the antivirus software that has probably been started on the computer.

IMPORTANT: In the following we describe how a CLA is **locally** installed on each cluster node. It is **not installed in the cluster context**.

NOTE: You can use the instructions we give in this chapter also if CLM and CLAs were installed outside the cluster and the CLAs are now to be installed on the cluster nodes. Only step 10 on page 57 needs then to be performed in addition.

4.2.2.1 Licenses

License file

A license file comprises information about

- the features to be licensed, for example Notes, Presence, XML APL, SOAP Interface, voice recognition,
- the number of licenses for each feature and
- the MAC address(es) of the computer(s) on which a CLA operates and for which licenses are to be created.
- License file types

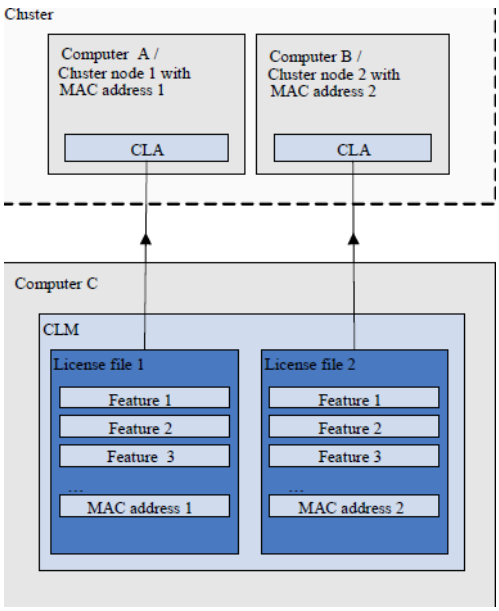
There are two types of license files:

- License file with only one MAC address

  Available are two cluster nodes with one CLA each. Cluster node 1 has the MAC address 1 and cluster node 2 has the MAC address 2. The CLAs obtain their license information from the CLM, which operates on a separate computer C. The CLM has two license files, license file 1 for cluster node 1

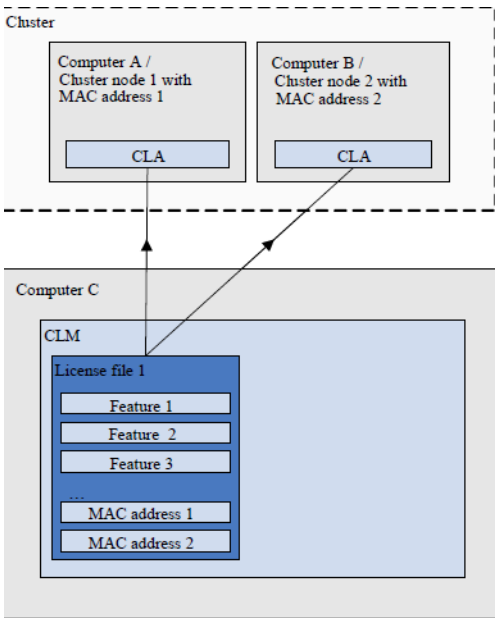
and license file 2 for cluster node 2. Both license files contain the same features, but license file 1 contains the MAC address 1 and license file 2 contains the MAC address 2.

This also applies if a license respectively a license file is to be used for a product installed on a computer that is no cluster node. The ISDN APL, for example, is such a case as it must not be installed on a node (see point 4 on page 23).



- License file with several MAC addresses

  Available are two cluster nodes with one CLA each. Cluster node 1 has the MAC address 1 and cluster node 2 has the MAC address 2. The CLAs obtain their license information from the CLM, which operates on a separate computer C. The CLM has only one license file, which contains all features and both MAC addresses of the two cluster nodes.



Creating the license files

When you create license files in the CLS with only one MAC address for each file, you need two license files with identical features but with mandatorily different MAC addresses.

If you select the **Cold Standby Main-Backup** option in the CLS when creating a license file, you create a license file with more than one MAC address. This license file is used for both cluster nodes on which the CLAs operate.

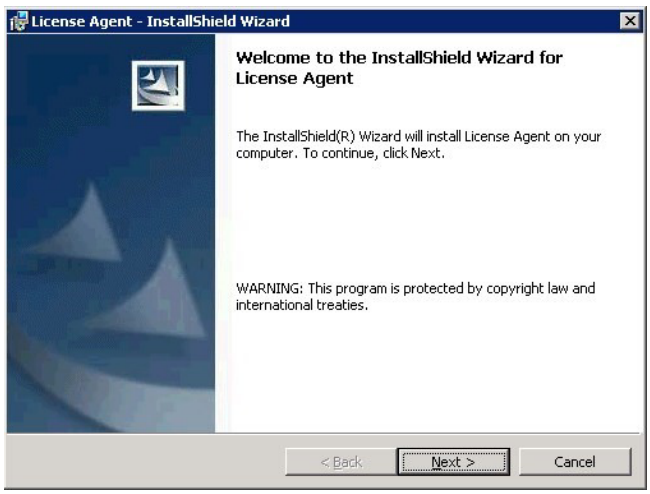
4.2.2.2 Installation of a CLA

How to install a CLA:

1. Download the latest CLA version from SWS.
2. Log on to the first node as domain user, not as local user

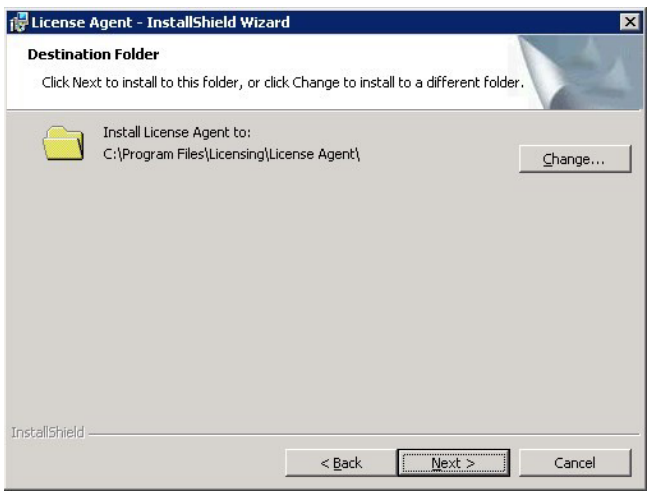
3. Start the CLA `setup.exe` file

   The setup is prepared and the following dialog opened:



4. Click on **Next** >.

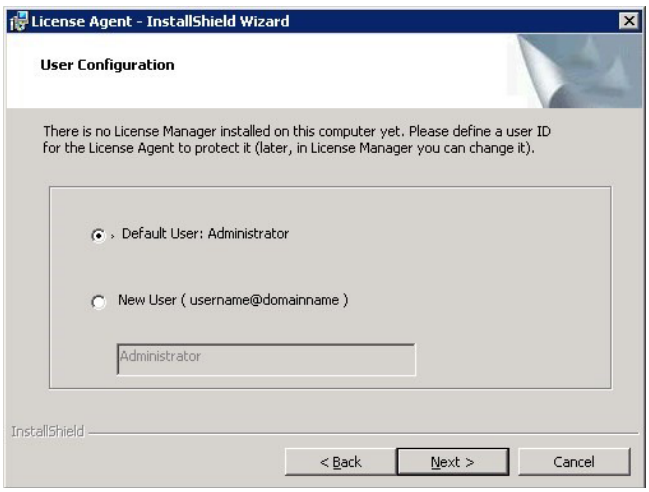
   Up comes this dialog:



5. If you wish to use the defaulted target folder, click on **Next**.

   Via the **Change...** button you can specify another target folder for the installation. Subsequently, click on **Next** in this dialog.

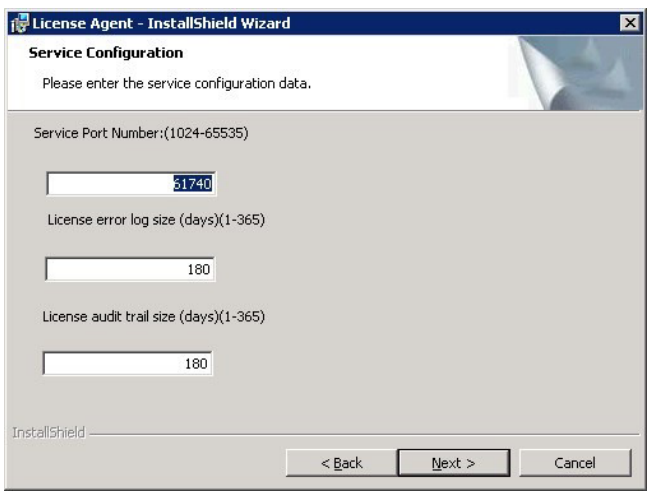
Up comes this dialog:



6. Select the user under whose account the CLA is to run. This must be a domain user and no local user. Select the **New User** option and enter the domain account under which you perform the setup, for example the domain account that you assign to the satellite services.

   Then click on **Next**.

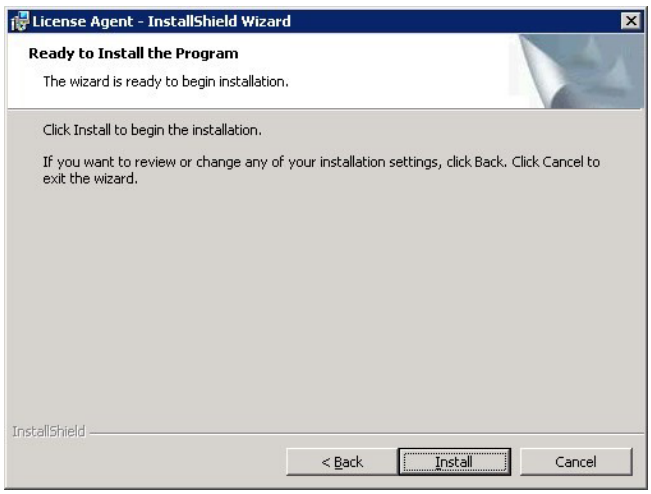
   Up comes this dialog:



7. If you have not changed the ports during the CLM installation, you can copy the settings here. Click on **Next** >.

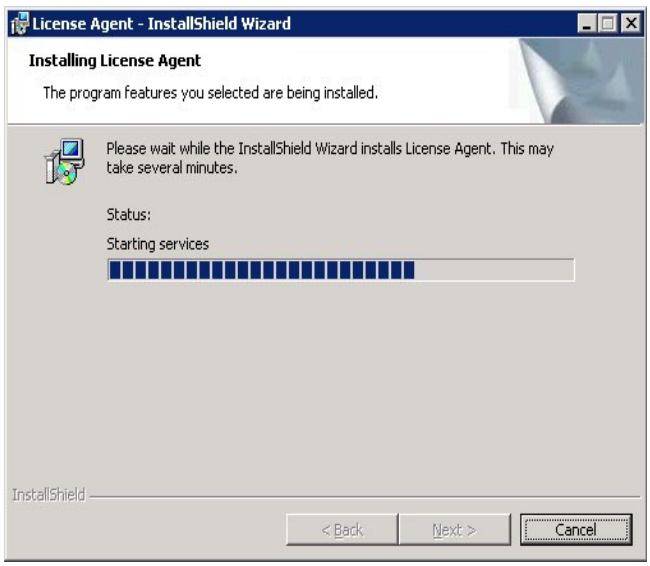
NOTE: If you change the entry in the Service Port Number field you need to enter this modified port number with the license service installation (cf. Section 4.3.4.1, “Installation of the License Service in the Cluster”, on xxxxx.

Up comes this dialog:

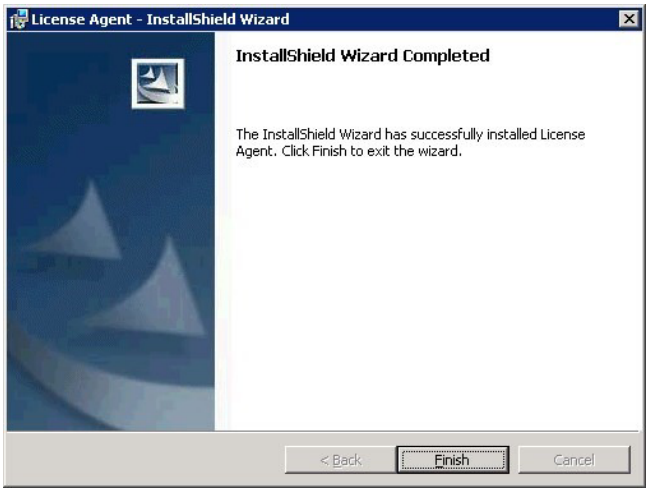


8. Click the `Install` button.

   The installation starts and you can see the progress in the following dialog:



As soon as the installation process is complete, the following dialog appears:



9. Click the Finish button to complete the installation.
10. The dialog closes.
11. Only if CLM and CLAs were installed outside the cluster and the CLAs are now to be installed on the cluster nodes you need to perform this step. Otherwise you can omit this step 10 since an analog action will later be performed later in step 7 on page 61.

    Two CCF files were created on the cluster drive. You find them typically as `R:\OpenScape\xprlicsvc\HPXPR_V5.0.ccf` and `R:\OpenScape\xprlicsvc\hlm\License Management Information\HPXPR_V5.0\HPXPR_V5.0.ccf`.

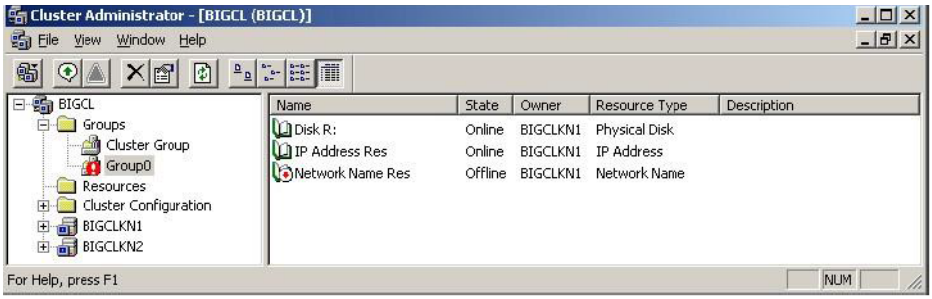
    Example of a created CCF file:

    ```
    172.26.9.46
    61740
    30000
    3
    true
    ```

    Replace the value of the first line in both files with the IP address of the resource of type IP Address:

    NOTE: The IP address of the IP Address resource is not the IP address of a node but the IP address of the group for the XPR server.

The further CCF file lines contain the port number, the time-out time in ms and the number of connection attempts.



a) In the Cluster Administrator click with the right mouse button on the previously defined resource of type IP Address and select the **Properties** option from the context menu.

b) Click on the **Properties** tab.

c) Copy the value of the **Address** field to the clipboard.

d) Override the first line of both CCF files with the value from the clipboard.

e) Save both files.

The installation of the CLA on this node is now complete. The CLA must now be added to the CLM, it must be synchronized with the CLM an its license must be activated.

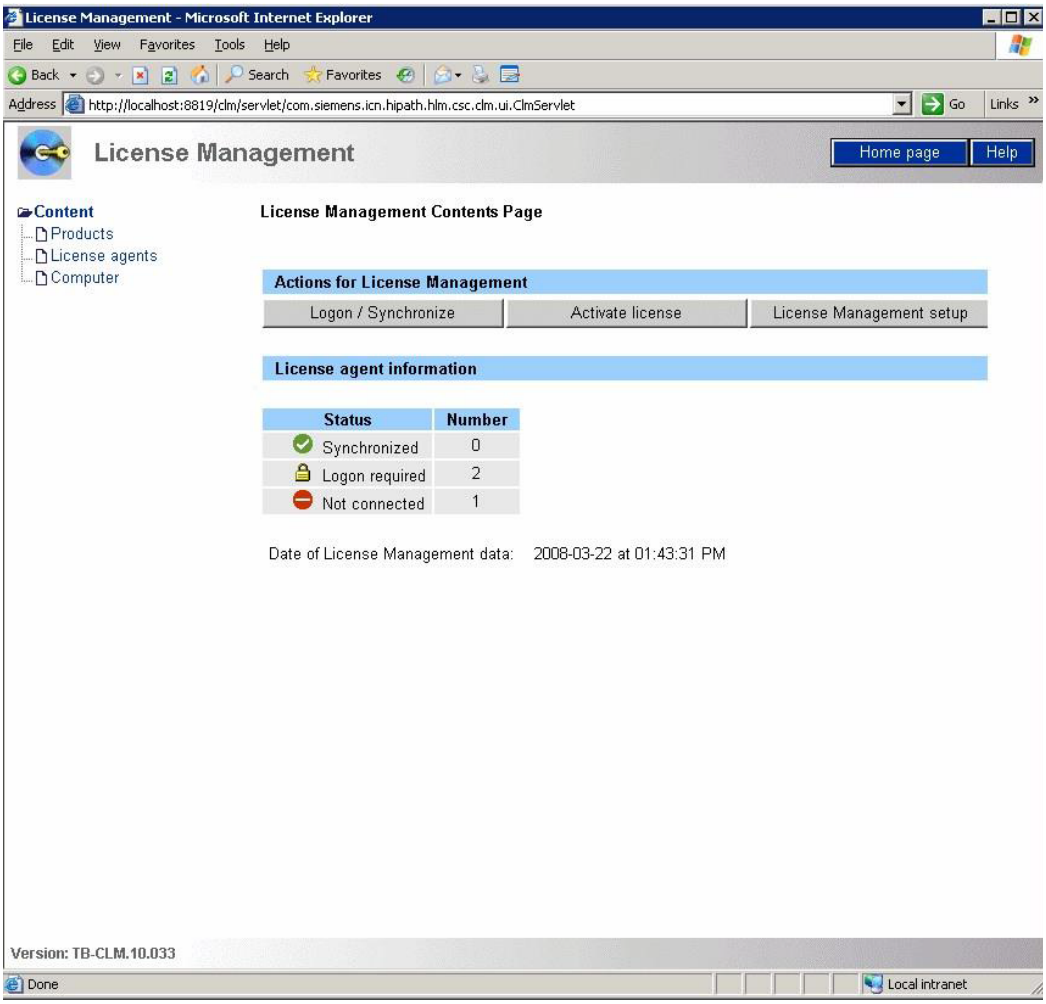
4.2.2.3 Adding a CLA to the CLM

How to transfer already available licenses to the CLA:

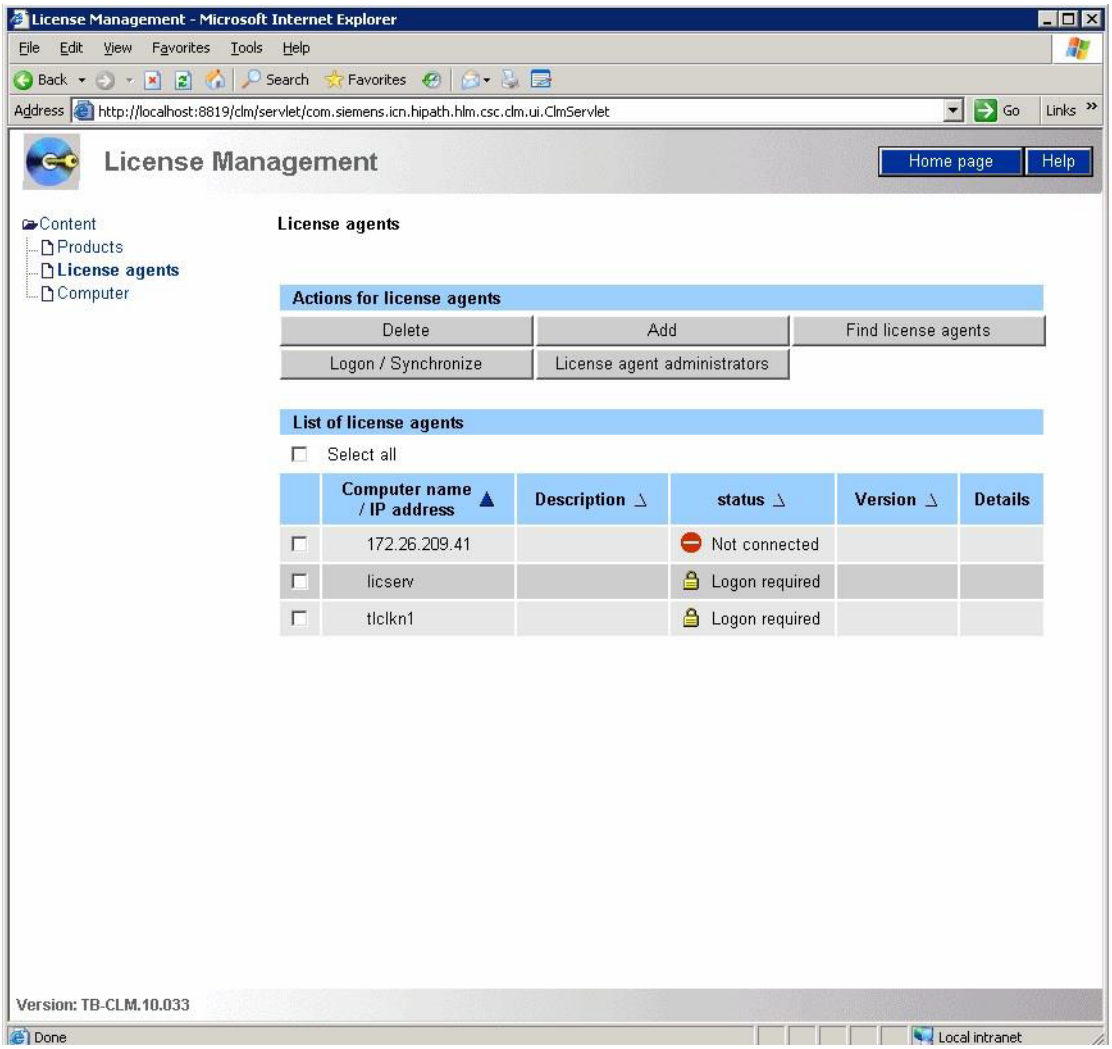
1. The desktop link found on the computer on which the CLM is installed starts the CLM. You can also enter the address

   ```
   http://localhost:8819/clm/servlet/
   com.siemens.icn.hipath.hlm.csc.clm.ui.ClmServlet
   ```

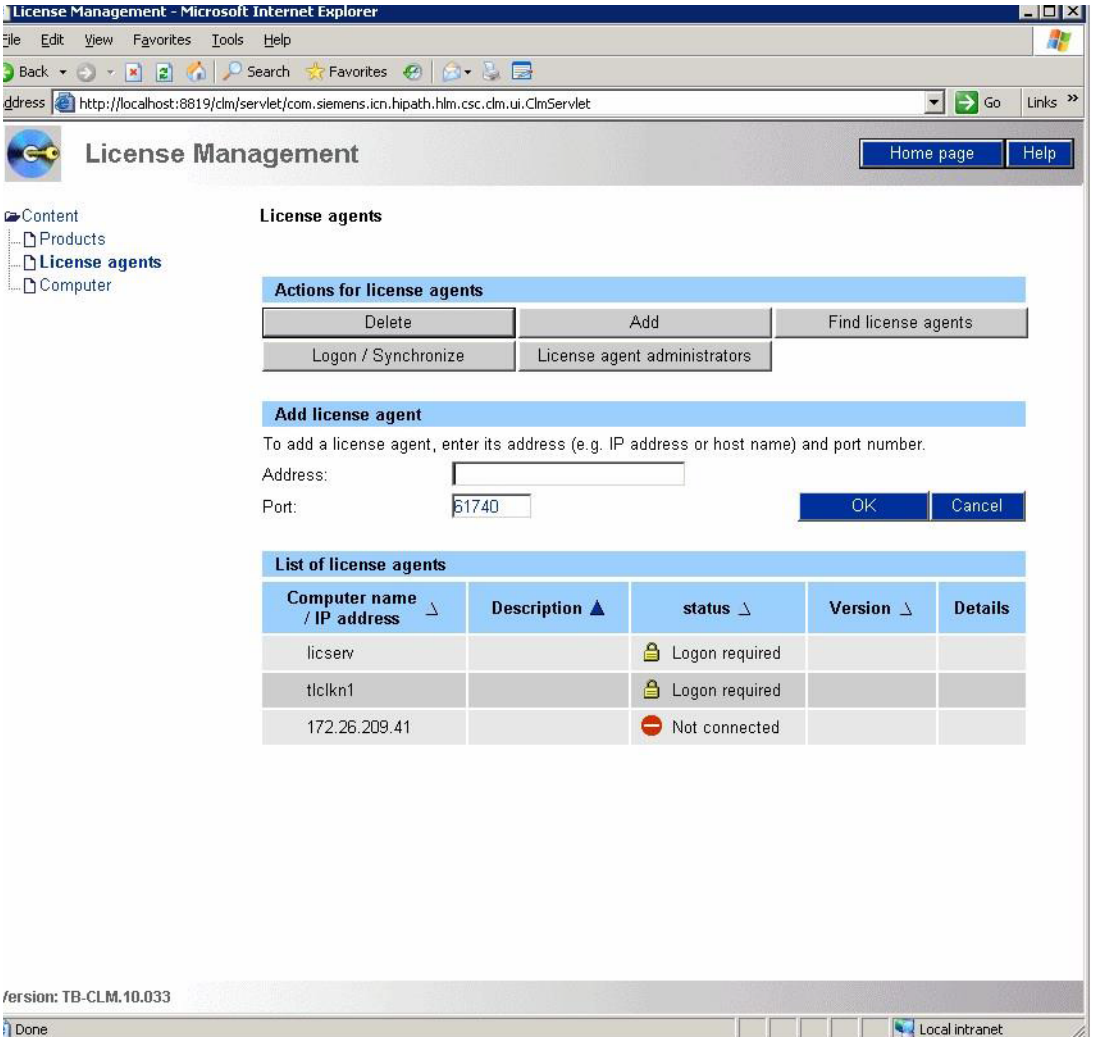
   in an Internet browser on the computer on which the CLM is operated. Loading the entire page may take a while.



2. In the navigator click on **Content** > **License agents**.



3. In the **Actions for license agents** section click the **Add** button.



4. Enter the DNS name or the IP address of the node on which the CLA was installed.

IMPORTANT: **Neither** enter the IP address of the resource of type IP Address of the cluster group **nor** the IP address of the resource of type IP Address of the group for the XPR server.

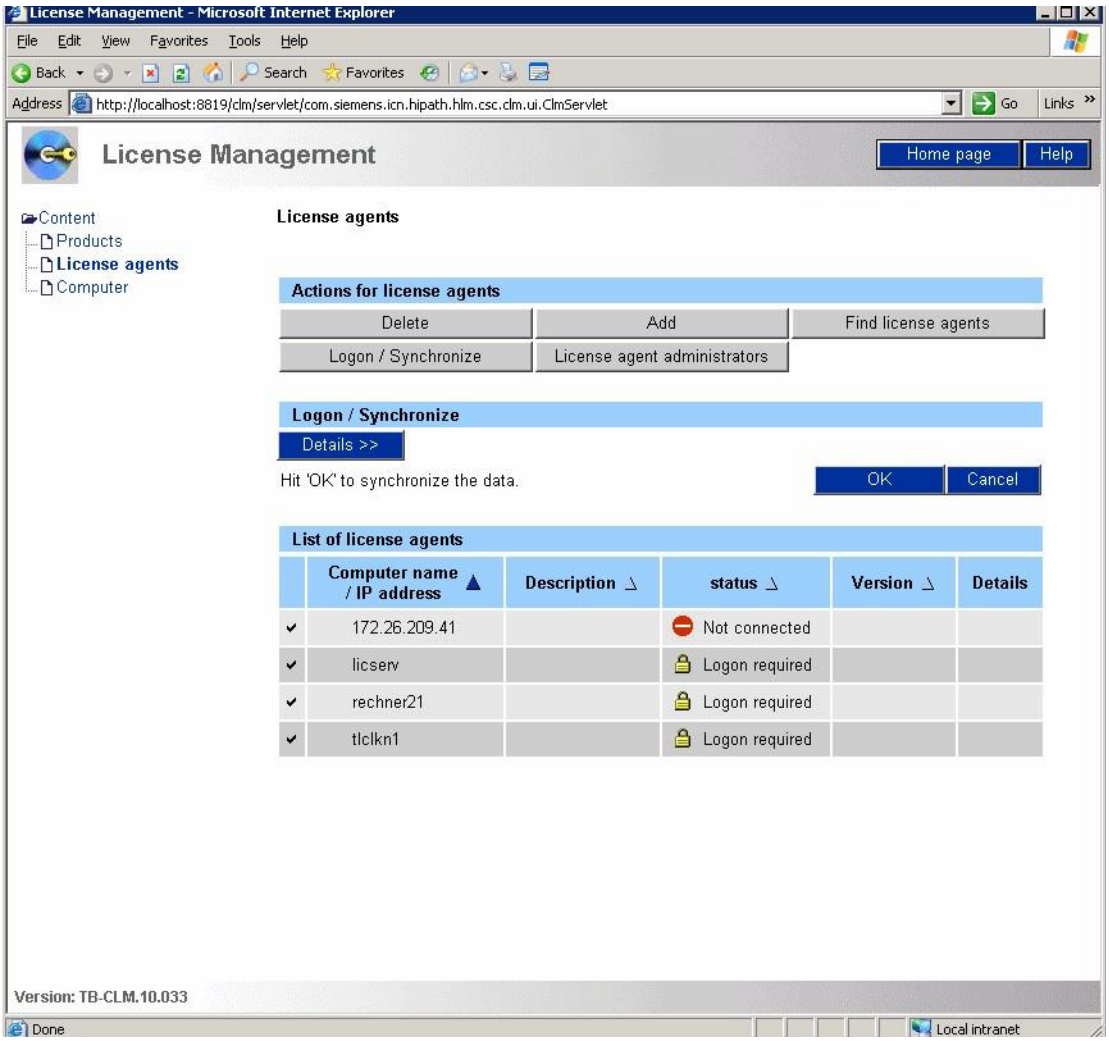
Click on **OK**.

4.2.2.4 Synchronizing a CLA with the CLM

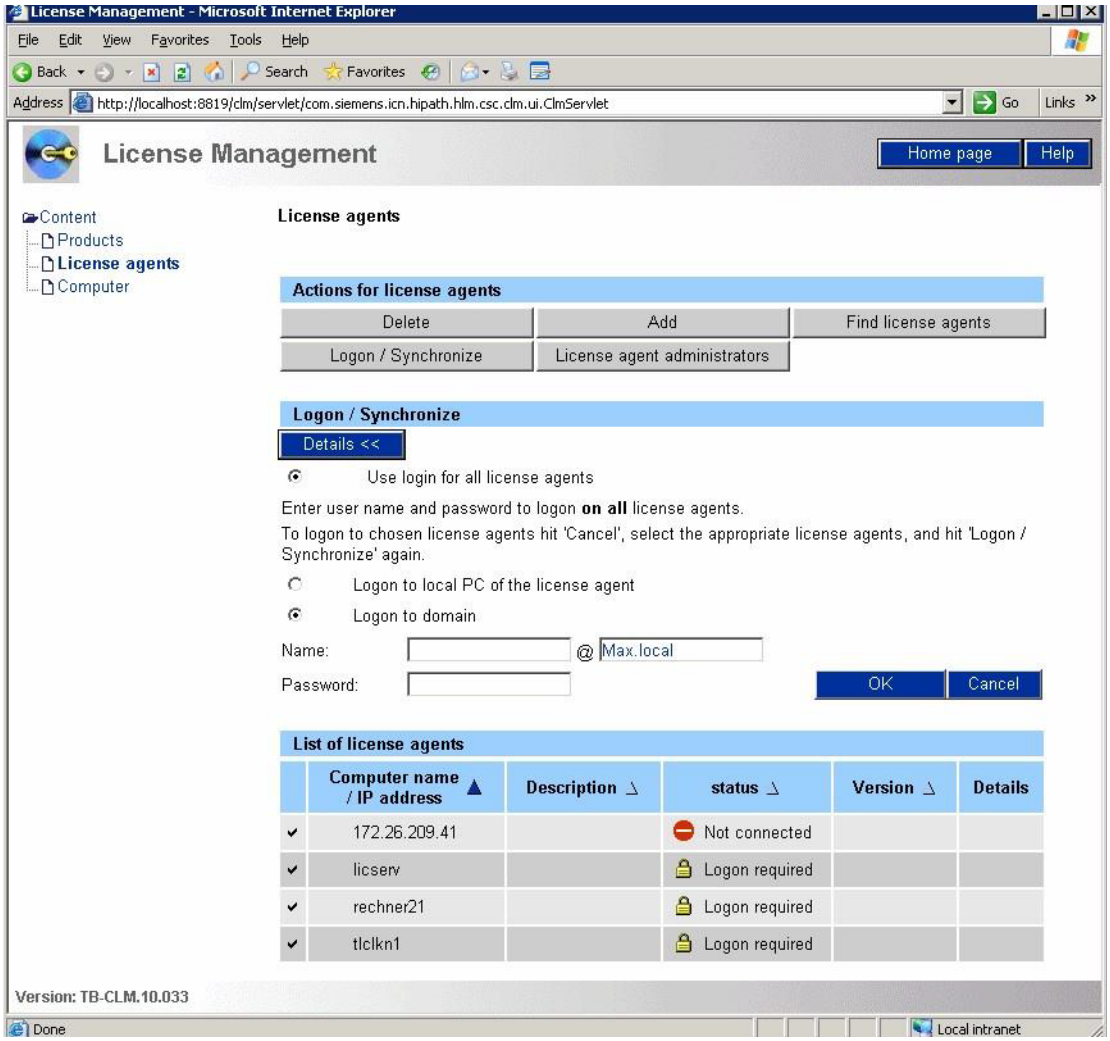
1. Synchronize the CLM with the CLA. This a mandatory requirement for activating the licenses for the CLA (see Sectiont 4.2.2.5 on page 4-69)

   Proceed as follows:

   a) On the CLM interface click on the **Login/Synchronize** button.



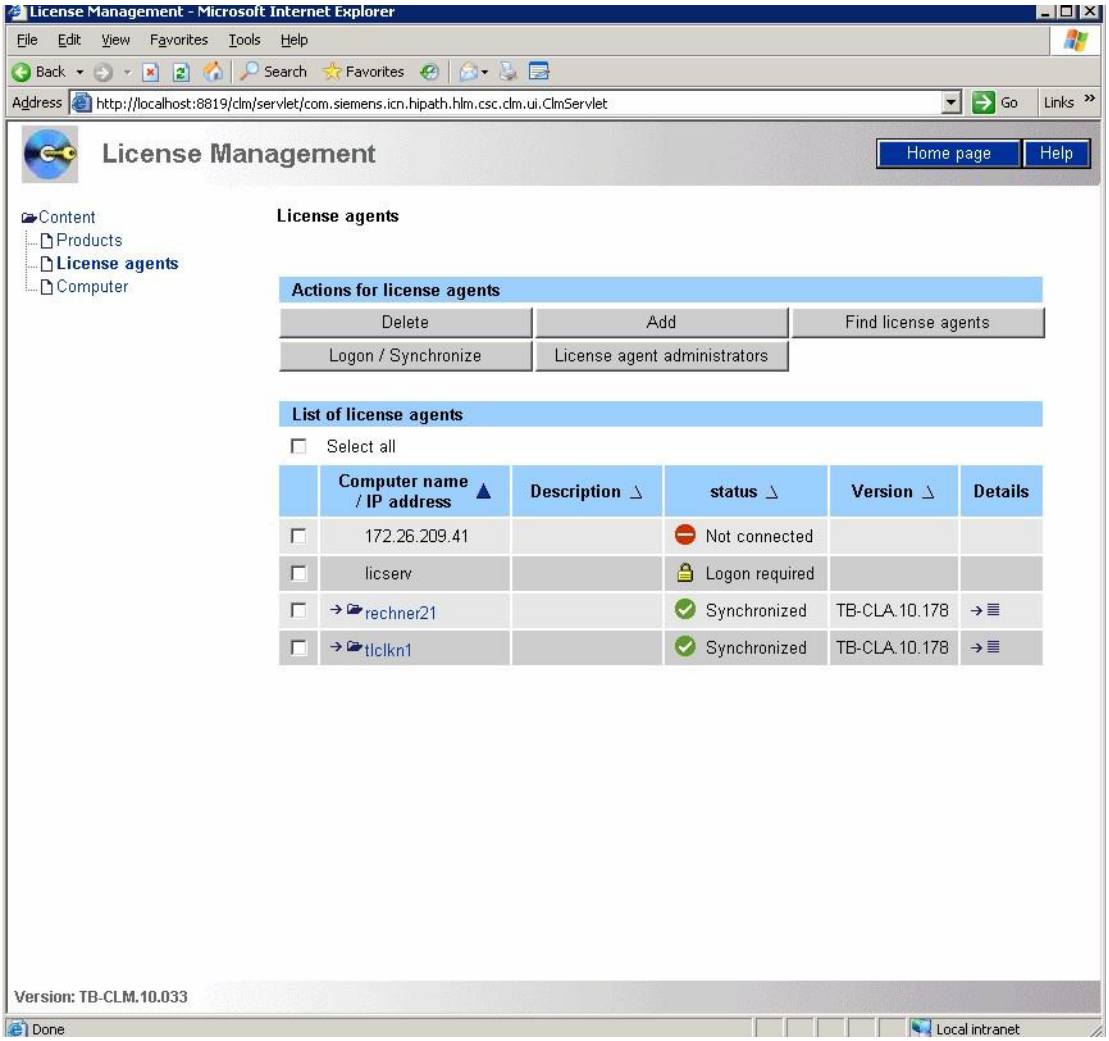
   b) Click on the **Details** >> button.



c) Select the **Logon to domain** option.

d) Enter the user name and password in the **Name** and **Password** fields.

e) Afterwards, click on OK.



4.2.2.5 Activating a License for a CLA

In this section we assume that the license is available on a data carrier as XML file. If you want to create a license, read the corresponding section in the OpenScape Xpressions Server Installation manual and in the CLM online help.

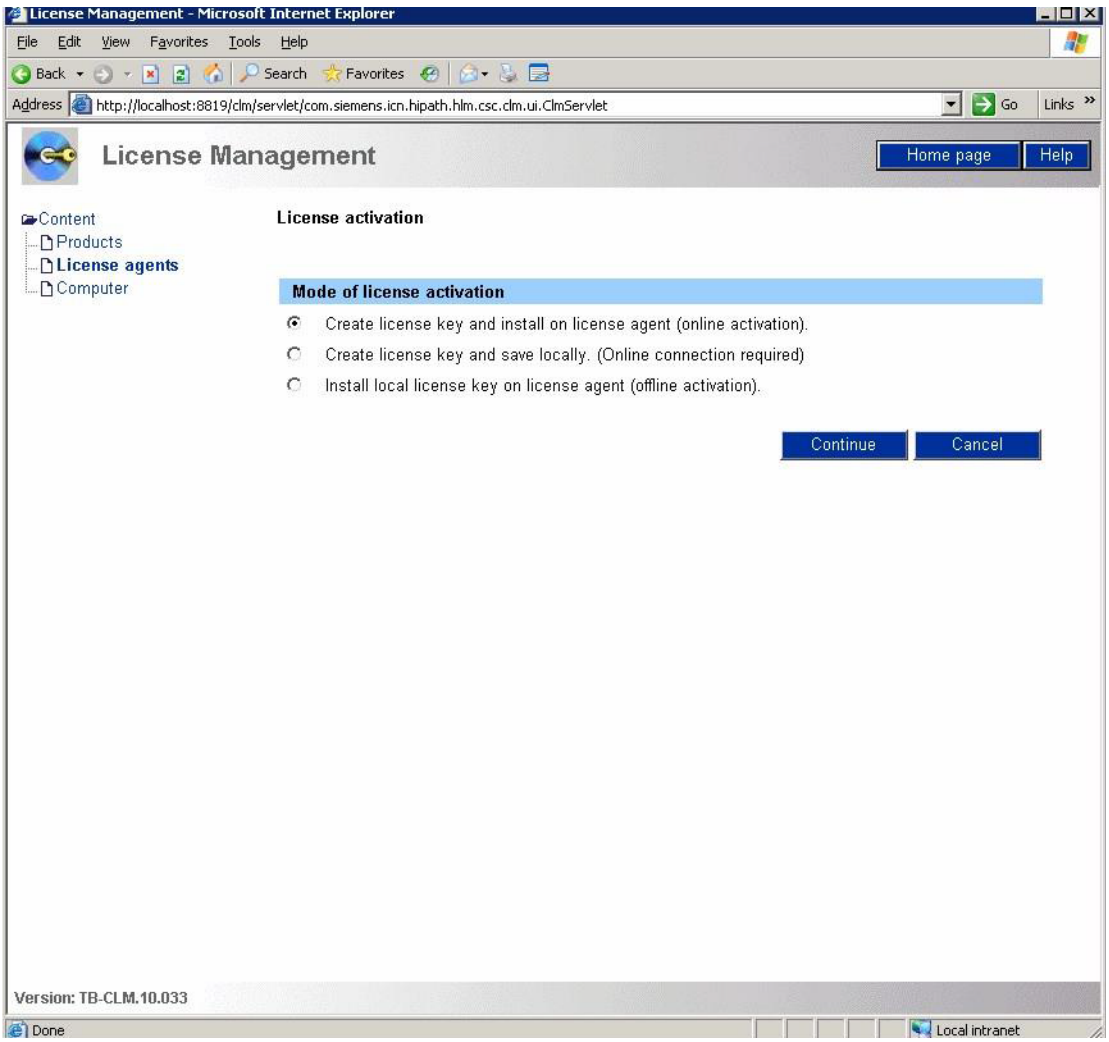
NOTE: To create licenses you need logon data for the license server (CLS; Central License Server) and an authorization code.

---

1. Transfer the license to the CLA and activate it. Proceed as follows:

   a) In the CLM navigator click on the **Content** entry respectively on the **Home page** button at the top right margin. This button is always displayed when you are not on the contents page.

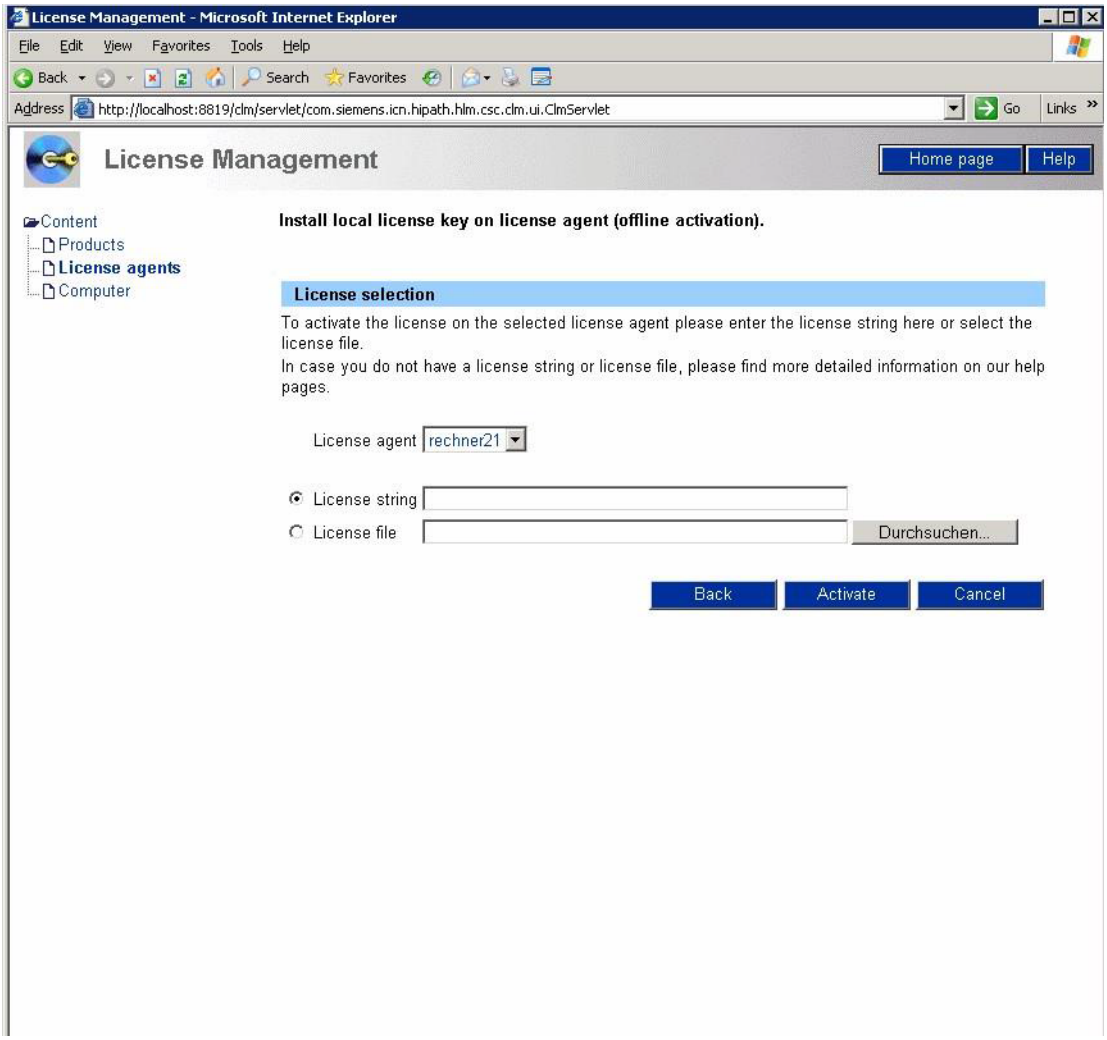
   b) Click the **Activate license** button.



   c) Select the **Install local license key on license agent (offline activation)** option.

Selecting one of the other two options makes the license server (CLS) request the license. To this you need the logon data for the license server as well as the authorization code. Information about creating licenses on the license server and about the proceedings that follow this license creating can be obtained from the OpenScape Xpressions Server Installation manual or via the **Help** button at the top right margin of the CLM interface.

d) Push the **Continue** button.



e) If required, select in the **License agent** field a computer on which the agent is operated for which the license is to be activated.

f) Select the **License file** option.

g) Click the **Browse...** button and select the license file in the computer's file system respectively on the external data carrier on which it has been stored. This is an XML file.

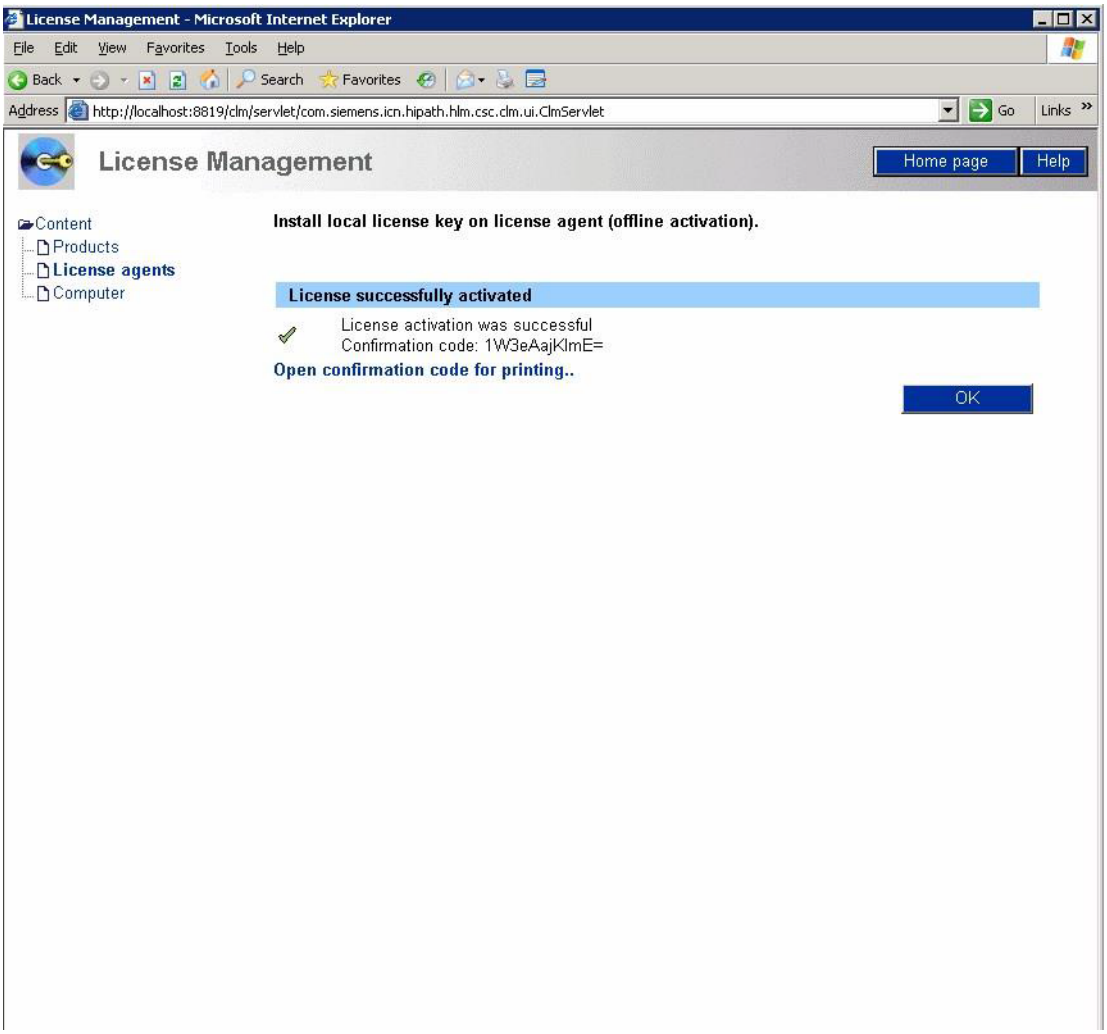
IMPORTANT: Be sure to activate the same licenses for each CLA. The XPR does not check licenses on different nodes for sameness.

IMPORTANT: If you have created a separate license file for each cluster node, verify that the licenses are the same but that the license files differentiate in their MAC address (see Sectiont 4.2.2.1 on page 4-56).

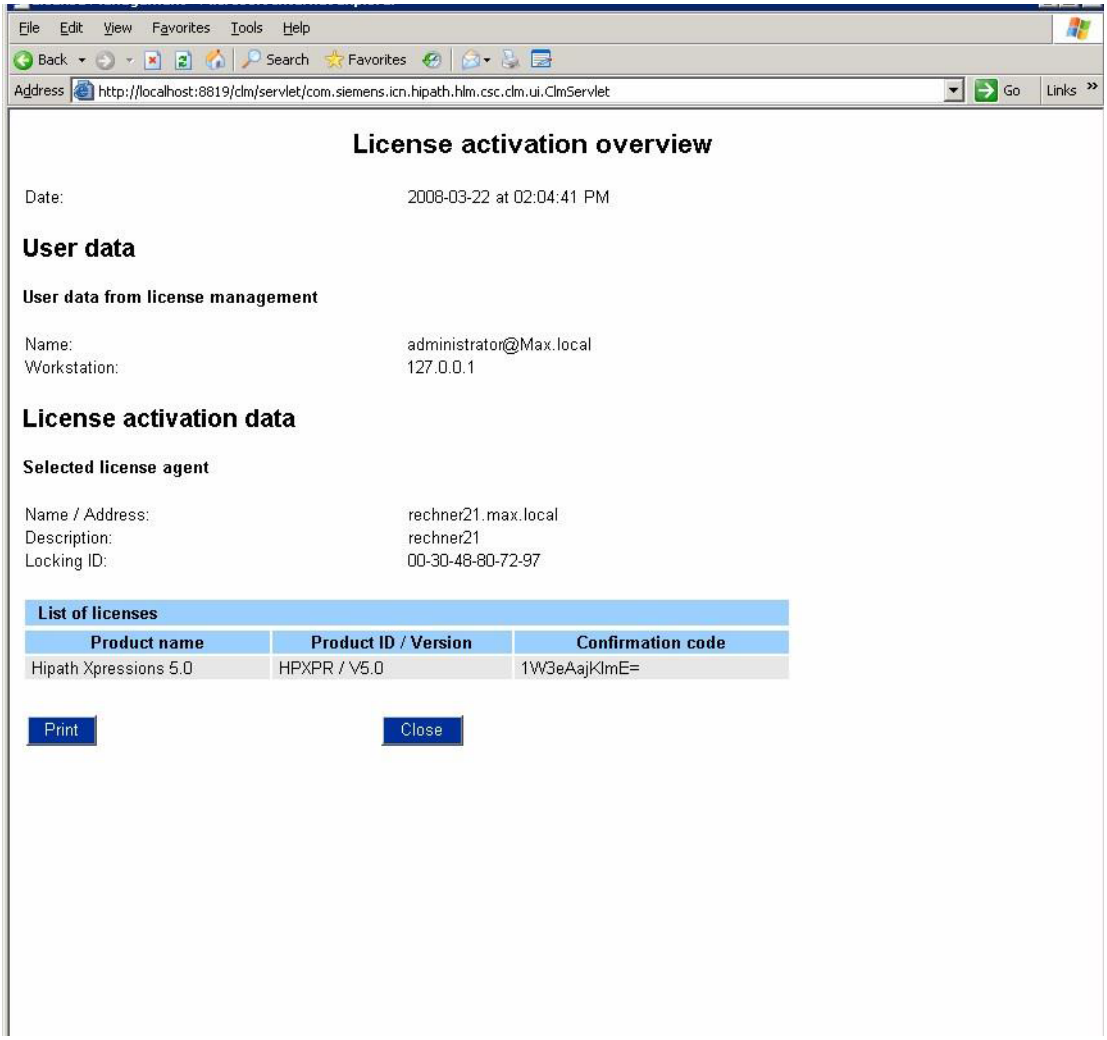
---

h) Click the **Open** button.

i) Click the **Activate** button.



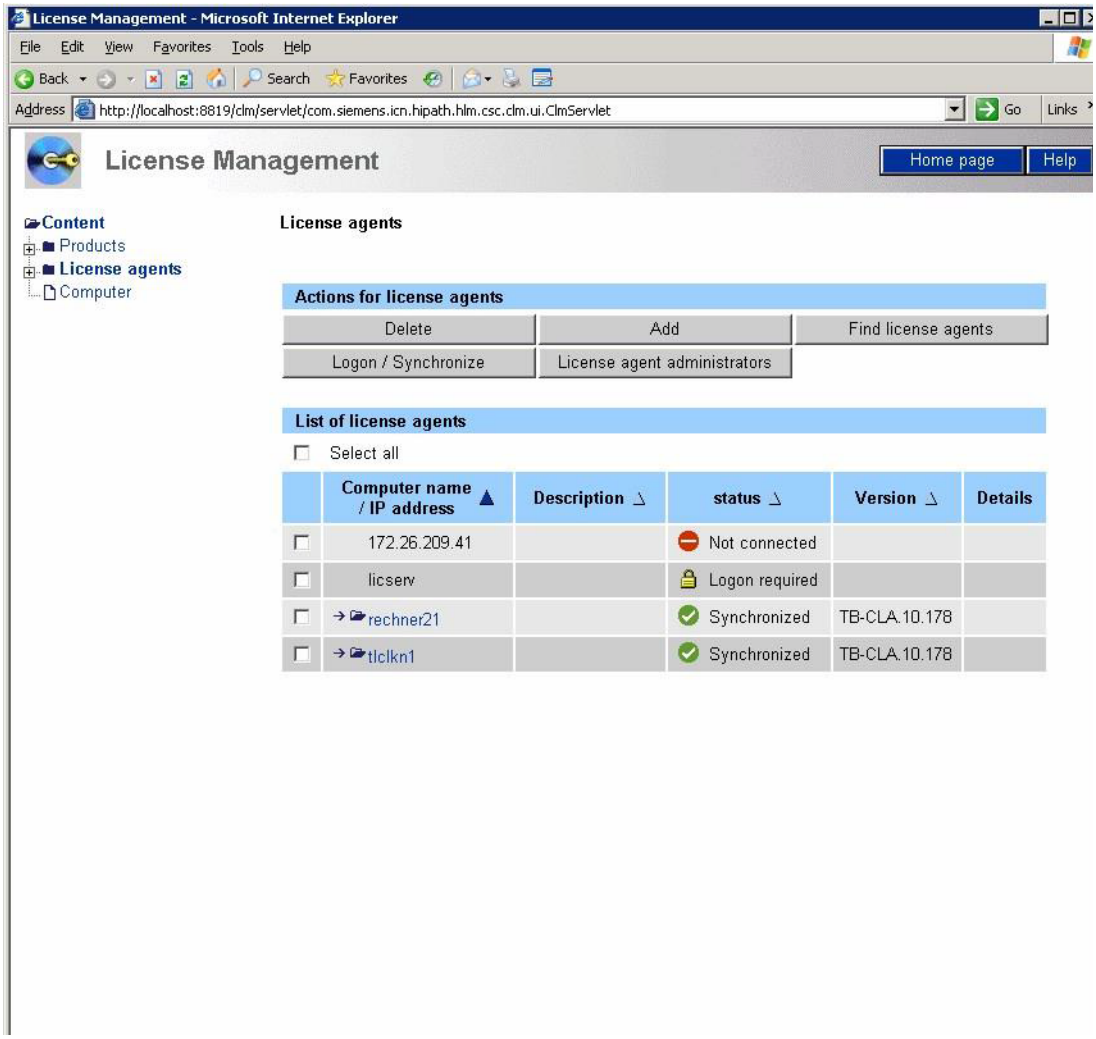
j) Click the **Open confirmation for printing**.. link.



k) Click the **Print** button. The operating system's print dialog opens, in which you can select a printer and start printing via the **Print** button.

l) In the CLM click on **Close**.

m) In the CLM click on **OK**.



2. The license is now active and can be used.
3. Execute the steps in

- Sectiont 4.2.2.2 on page 4-58 on the second node and execute the steps in
- Sectiont 4.2.2.3 on page 4-64
- Sectiont 4.2.2.4 on page 4-67 and
- Sectiont 4.2.2.5 on page 4-69

4.3 Performing the Initial Installation

This section describes the performance of the initial installation. The sequence of the numbered subsections (Section 4.3.1, “Notes for the Installation”, on page 75 to Section 4.3.12, “Installation Type for the automatic Speech Recognition”, on page 91”) reflects the actual installation process.

4.3.1 Notes for the Installation

Please heed the following notes for the installation:

- Before you begin with the installation, deactivate the antivirus software that has probably been started on the target computer.
- Make sure that a HiPath License Management is available in the network and install a HiPath License Agent before the XPR server setup (see Section 4.2, “Installing the HiPath License Management (HLM)”, on page 55).
- The installation sources are exclusively shipped on an installation medium that carries the installation sources for the XPR server software, drivers, AddOns, client installation programs and language packets for e.g. German, English (US), English (UK), French and Canadian French.
- If you cannot access the setup medium from the target computer, you can start the installation from any DVD drive released in the network or from a regular network share.

Installation from a network share

1. First, copy the entire content from the setup medium into a directory on this network share.
2. Then, start the `setup.exe` file in the directory on the network share into which you have copied the content of the setup medium.

- In this chapter we assume that no XPR components have yet been installed on the target computer.

4.3.2 Creating a Login Account for XPR Services

To run the required XPR services in the cluster context they must be started with a user account that exists on all nodes of the cluster and grants identical privileges. This account must be created by the local network administrator and furnished with the required privileges.

The user account created for executing the services must at least fulfill the following conditions:

- The user must be a domain user and belong to the same domain in which the XPR Server is installed.
- The user must have the **Log on as a service** privilege.
- The user must be available on all nodes on which the XPR server is installed.

You can use this account in Section 8.4.3, “Login Account for XPR Services”, on page 95 to activate the Assign an account to Xpressions services check box (see also Section 2.6, “Assigning a Login Account for XPR Services”, on page 38)

4.3.3 Settings and Selection of the Components

1. Connect the XPR setup medium to the first node. If the Autostart mode is active, the Wrapper starts automatically.

   Select the **Run** command in the Windows start menu. A dialog opens. Enter

   `x:\XpressionsInstall\Cluster\clusterprep.exe` in the **Open** text field with x representing the drive letter of the setup medium or of the connected network drive. Confirm your input with **OK**. Enter the cluster name and confirm your input with OK. As an alternative, you can use the Windows Explorer to start the `clusterprep.exe` file.

   NOTE: If the Autostart mode is disabled for reading external media, execute the `Setup.exe` program in the x:\XpressionsInstall directory of the setup medium to start the installation. Select the **Run** command in the Windows start menu. A dialog opens. Enter `x:\XpressionsInstall\Setup` in the **Open** text field with x representing the drive letter of the setup medium or of the connected network drive. Confirm your input with **OK**.

   ---

2. The Wrapper checks whether the required **C++ Redistributables** are already installed on the computer. The C++ Redistributable enable the execution of programs that were compiled with the VC compiler.

   If the C++ Redistributables have not been installed yet, their setup is started and automatically executed to completion.

3. Subsequently the following welcome screen is displayed:

The welcome screen closes after a moment and the installation continues with the license service installation (see Section 4.3.4, “Installing/Connecting the License Service”, on page 78).

NOTE: All **C++ Redistributables** must also be installed for granting a smooth operation of the license service. On a node you need to install all **C++ Redistributables** manually.

4.3.4 Installing/Connecting the License Service

All licenses you have purchased are summarized in an `*.xml` file and obtained via the License Management.

IMPORTANT: After you have received the license file, save it on an external data carrier and protect it from unauthorized access or unintentional deletion.

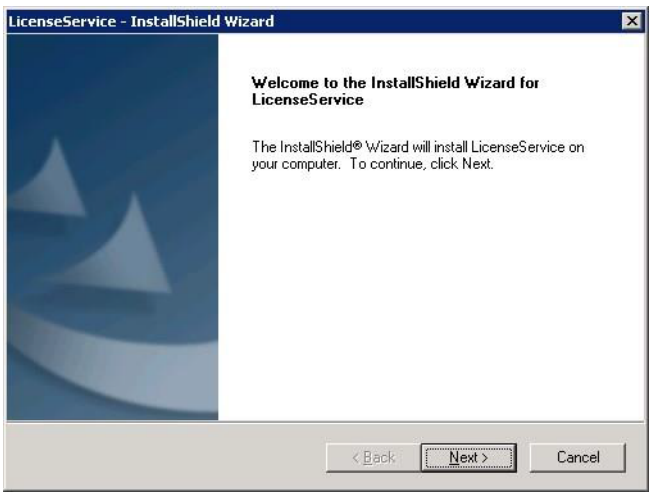
By means of the license service the installed server components check whether a valid license is available.

The license service must be installed in the resource (cf. Section 4.3.4.1, “Installation of the License Service in the Cluster”, on page 78), so that it is also available in case of a failover.

4.3.4.1 Installation of the License Service in the Cluster

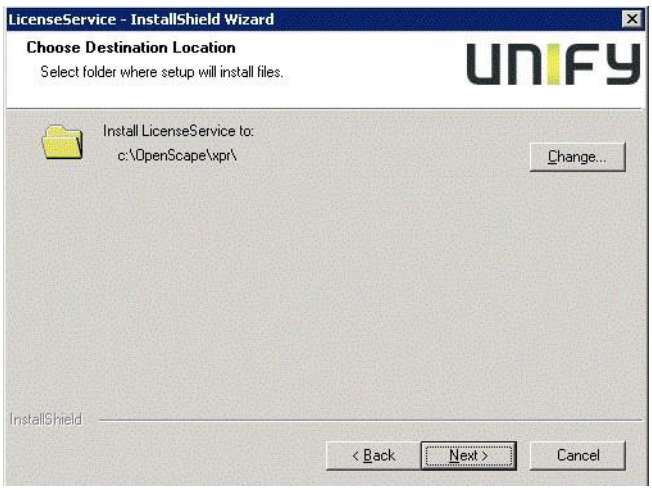
How to install the license service in the cluster:

1. Select the **New license service installation** option.
2. Click on **Next** >. The license service installation routine starts and the following dialog opens:



3. Click on **Next** >.

   Up comes this dialog:

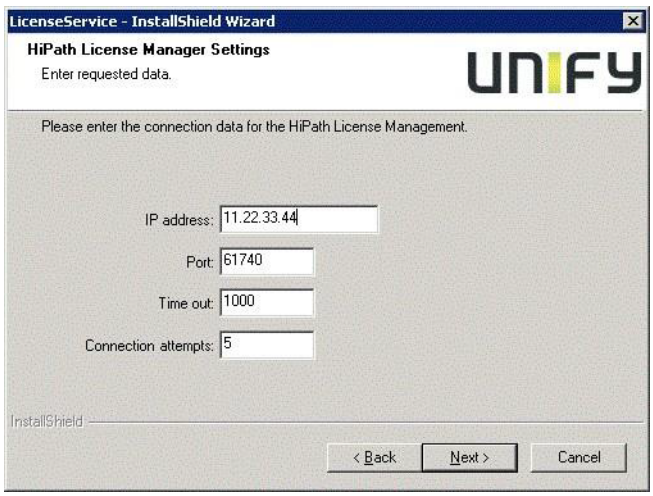


4. Click on the **Change...** button
5. Verify that the installation target folder is on the cluster drive (typically r:).

   IMPORTANT: Never specify a local drive as target path here. The XPR installation must be performed on the cluster drive, so that the applications and services are available to all nodes of the cluster.

6. Click on **Next** >.

   Up comes this dialog:



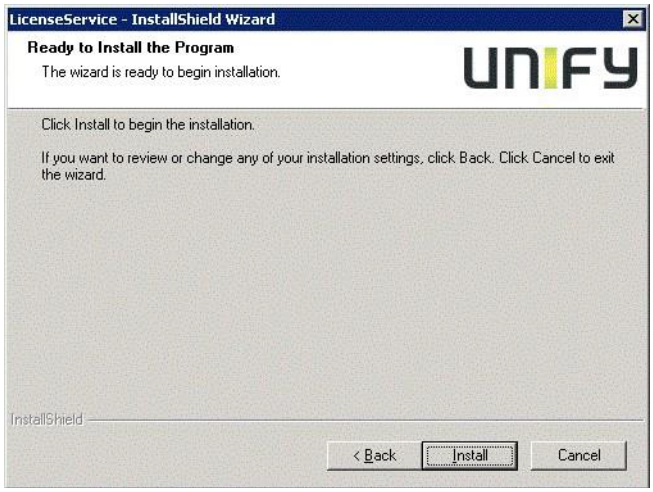
7. If the CLA is installed on a computer outside the cluster node (Section 4.2.1, “Installation of the CLAs outside the Cluster Nodes”, on page 56), specify the IP address of the computer on which the CLA is operated in the **IP Address** field. If the CLA is installed on both cluster nodes (see Section 4.2.2, “Installation of the CLAs on the Cluster Node”, on page 56), specify the IP address of the resource of type IP Address of the group for the XPR server in the **IP Address** field.

   IMPORTANT: **Neither** enter the IP address of the resource of type IP Address of the cluster group **nor** the IP address of one of the two nodes.

   Click on **Next** >.

   If you have not changed the ports during the CLM installation, you can copy the settings for the port here. The time-out in the **Time-out** field is specified in milliseconds.

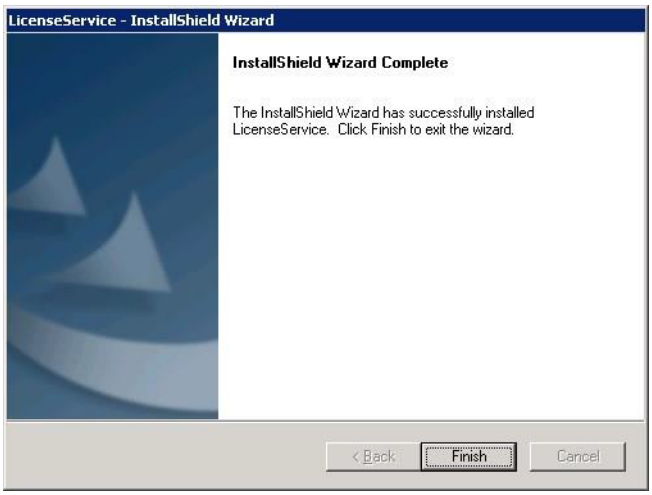
   Up comes this dialog:



8. Click the **Install** button.

   The license service installation starts. The installation progress is displayed in the following dialog:

   After the copying process has been completed, the following dialog opens:



9. Click on **Finish**.

   Up comes this dialog:

10. Click **Yes**, if you want to install further components, such as the XPR server software. Click **No**, if no further software is to be installed besides the license service.

    Subsequently, the Wrapper starts automatically and you need to specify the server name (cf. Section 4.3.5, “Specifying the Server Name”, on page 82).

4.3.5 Specifying the Server Name

NOTE: If the C++ 2008 Redistributable and the license service have already been installed, the installation of further components starts with this step.

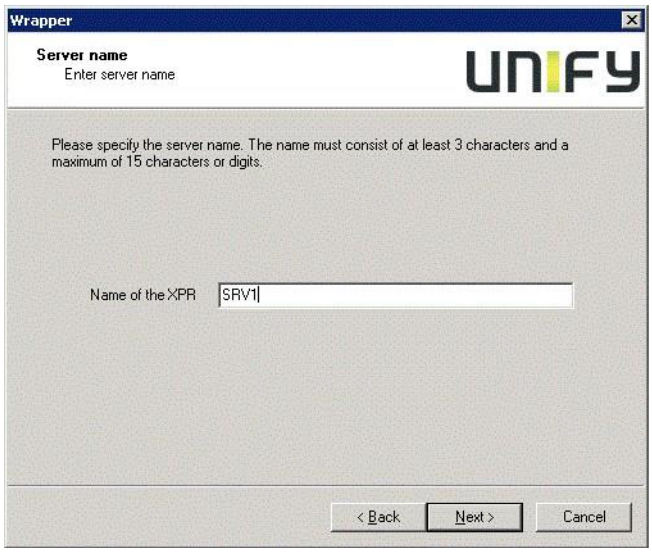
When you select the server name, heed the following points:

- the name you enter here **cannot be modified any more**
- the name must not contain blanks, special characters such as ;, !, %, &, ... , or German umlauts (ä, ö, ü)
- you must not use names of logical XPR lines. For example, ERGO, PhoneMail, VMS, COM, CON, FAXG3, FAXG4, MWI, FOD, PlayWave and SMTP will not be accepted.

- If you want to connect the XPR server to another XPR server via a Remote System Link, the server name selected here must not exceed a length of 11 characters.

NOTE: Remote System Link is not compatible with [Crypt_Sec], it is designed to only work with [KRYPT].

- Up comes this dialog:



11. Enter the desired server name in the **Name of the XPR** field.
12. Click on **Next** >.

    A dialog opens, in which you select the server languages to be installed (cf. Section 4.3.6, “Selecting the Server Languages and the Default Language”, on page 84).

4.3.6 Selecting the Server Languages and the Default Language

All languages supported for the XPR server are supplied in one language packet each. Each language packet contains the necessary files to provide, for example, the Web Assistant or the voice mail system in the corresponding language.

The following languages are available:

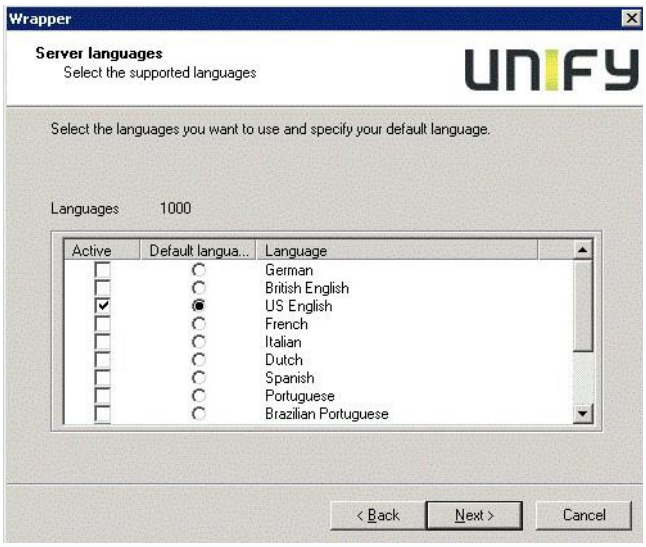
- German
- British English
- US English
- French
- Italian
- Dutch
- Spanish
- Portuguese
- Brazilian Portuguese
- Russian
- Turkish
- Spanish (USA)
- Canadian French
- Slovenian

The dialog shows all available language packets. On top of the list you can see the number of purchased language licenses. One language license is valid for an arbitrary language.

The default language selected here is also the greeting default language of the voicemail system **ERGO** of the voicemail systems **PhoneMail** and **VMS** and of the **Web Assistant**.

If further language packets are installed, the users can switch the Web Assistant as well as the TUI to one of these languages. When a new user logs on to the Web Assistant for the first time, the Web Assistant and the TUI interface feature the default language selected here.

1. Up comes this dialog:



2. In the **Active** column, select the languages to be installed. Only select as many languages as licenses are available.

   NOTE: You need to select at least one language, otherwise you cannot continue the installation.

3. In the **Default language** column, select the language that the XPR server is to use as default.

4. Click on **Next**.

   A dialog opens, in which you need to confirm the Release Notes (cf. Section 4.3.7, “Confirming the Release Notes”, on page 85).

4.3.7 Confirming the Release Notes

In the Release Notes you find among other things information about the following topics:

- Software build number
- General hardware requirements
- The latest upgrade information
- New-feature descriptions
- Bug fix descriptions
- Test scenario descriptions

- Compatibility list

1. Up comes this dialog:

   This dialog represents the `ReleaseNotes.rtf` file that you find in the `x:\XpressionsInstall` directory of the setup medium. "x" represents the drive letter of the setup medium.

2. Please read the Release Notes. Via the **External viewer** button you can open the Release Notes in the application that is registered in the operating system for the file type RTF.

3. Enable the **I have read the Release Notes** check box. This activates the Next button.

   If you do not enable the check box, the **Next** button stays inactive and you cannot continue the installation.

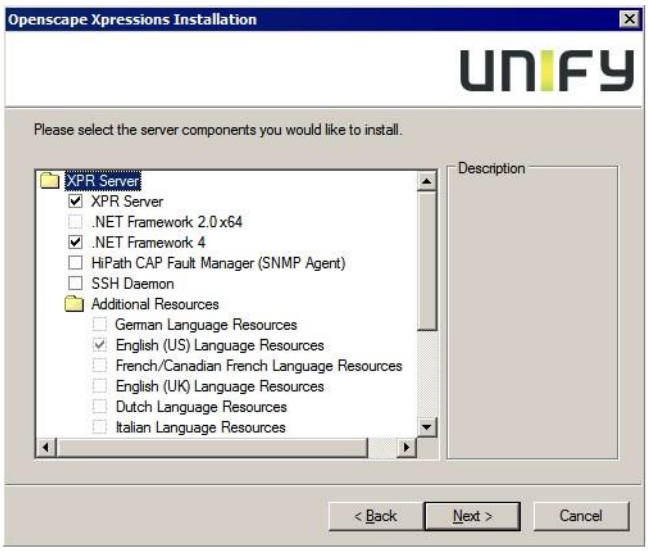
4. After you have read the Release Notes, click on **Next**.

   The dialog for selecting the system components opens (cf.Section 4.3.8, “Selecting System Components”, on page 87).

4.3.8 Selecting System Components

In this step you select the components of the XPR system to be installed. These include the actual XPR server software as well as additional resources, such as language packets and administrative components.

1. Up comes this dialog:



   Language packets that you have already selected in Section 4.3.6, “Selecting the Server Languages and the Default Language” are indicated in this dialog. The check box that you have activated for the default language there is displayed here in gray and cannot be deselected.

2. Make sure that only the components specified in the table further below are installed.

   IMPORTANT: Only activate the below installation options for installing the XPR server in a cluster system, since otherwise the XPR server in a cluster only works restrictedly or not at all. All further options must be disabled.

   In the following table you find descriptions of the components:

Server Component	Descriptio
XPR Server	Activate this option so that the Wrapper starts the XPR server installation (cf. Section 4.4.1, “Selecting Features”).
.NET Framwork 2.0	This option installs the .NET Framework 2.0.

Tabelle 6

Server Component	Descriptio
Additional resources	Here you may select additional language packets for the web interface and/or the telephone user interface of the voice mail system.

Tabelle 6

3. Click on **Next**.

   The dialog for selecting the client components opens (cf. Section 4.3.9, “Selecting Client Components”)

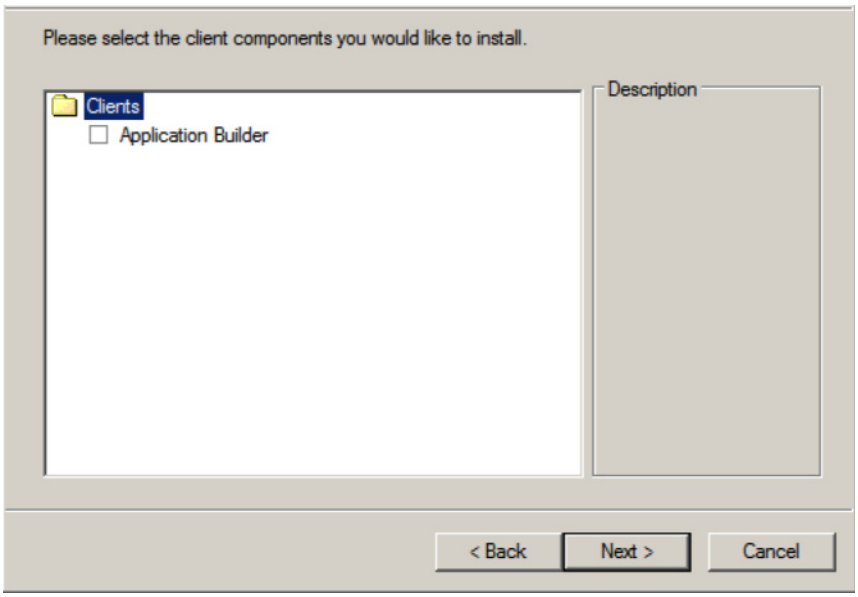
4.3.9 Selecting Client Components

The client components comprise the Application Builder. In this dialog you may select the client applications that are to be installed on your computer after the XPR server setup. Which components are offered here depends on the purchased licenses.

IMPORTANT: Disable all specified options for installing the XPR server in a cluster system, since otherwise the XPR server in a cluster only works restrictedly or not at all. See under Step 4 on page 25 (Section 2.2, “XPR Server Installation in the Cluster”) also the list of components that cannot be installed on a node.

---

1. Up comes this dialog:



2. For the installation of the XPR server in the cluster system disable the following client components via the corresponding check box.

- Application Builder

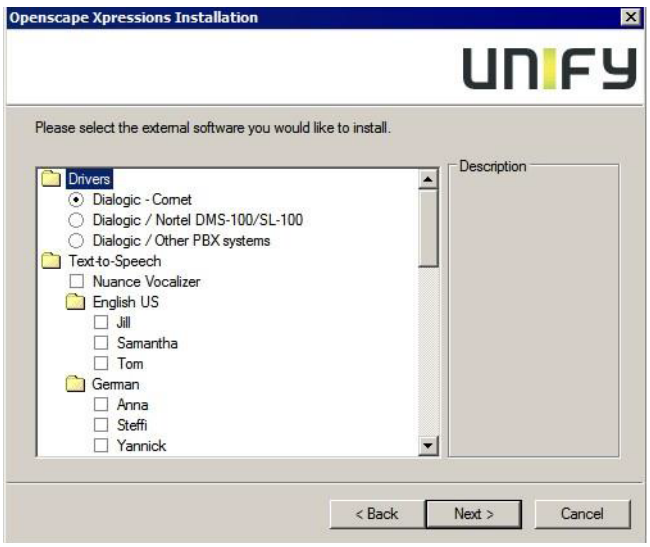
3. Click on **Next**.

   A dialog for selecting external software opens (cf. Section 4.3.10, “Selecting External Software”, on page 89)

4.3.10 Selecting External Software

IMPORTANT: In a cluster system the drivers for the communication hardware are installed on a satellite system. Therefore, all external software modules must be disabled for the installation at this point. See Step 4 a on page 25 (under Section 2.2, “XPR Server Installation in the Cluster”)

1. Up comes this dialog:



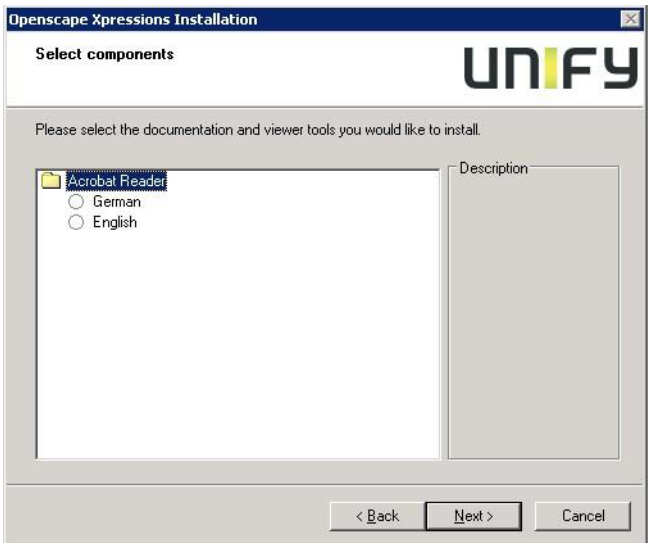
2. Disable all external software modules via the check boxes.
3. Click on **Next** to continue the installation.

   The dialog for installing Acrobat Reader 9.0 opens (cf. Section 4.3.11, “Installing Acrobat Reader”).

4.3.11 Installing Acrobat Reader

IMPORTANT: In a cluster system, Acrobat Reader is not used. Therefore, disable all options at this point and continue with the installation.

1. Up comes this dialog:



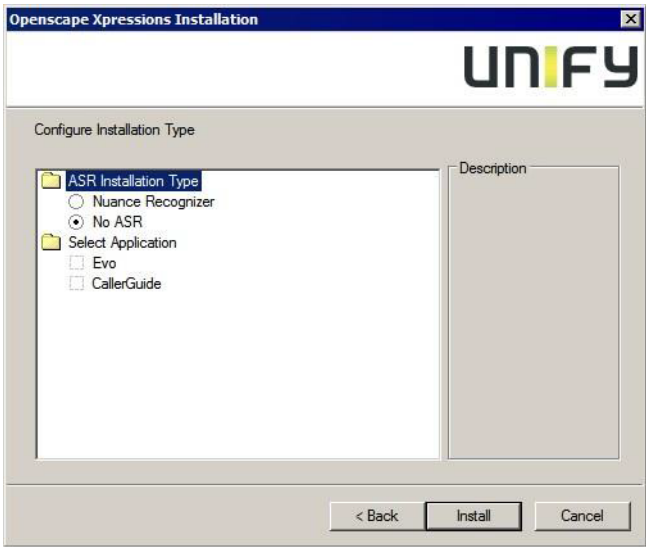
2. Deactivate all language versions for the viewer (Acrobat Reader).
3. If you have a license for Automatic Speech Recognition, the Next button appears. In case of the cluster setup this option must not be installed though, but must be disabled as described in the next section (cf. Section 4.3.12, “Installation Type for the automatic Speech Recognition”, on page 91).
4. If you do not have a license for Automatic Speech Recognition, the **Install>** button appears. In this case you can bypass the next section and continue with Section 4.4, “Installation of the XPR Server and Configuration of the Services”, on page 85.

   At this point the Wrapper has all information required for starting the installation of the selected components.

4.3.12 Installation Type for the automatic Speech Recognition

IMPORTANT: In case of the cluster installation, this option is not used. Please disable all options and continue with the next installation step. See also point 6e on page 26. (Under Section 2.2, “XPR Server Installation in the Cluster”)

1. Up comes this dialog:



2. Activate the options **No ASR**.
3. Deactivate all further selection fields.
4. Click on **Install**.

   The installation is being continued.

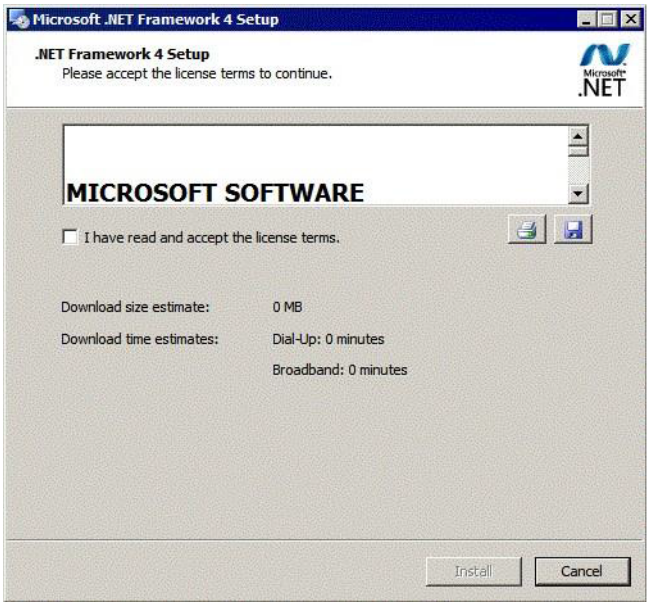
IMPORTANT: The installation of the components so far may require at this point a reboot of the local node. If a corresponding prompt appears at this point, please ignore it and perform the next step (Section 4.4, “Installation of the XPR Server and Configuration of the Services”, on page 85) first.

Do not reboot the computer until you have performed this step. After you have rebooted and newly logged in, the installation of the remaining components is continued automatically.

4.3.13 Installation of the Microsoft .NET Framework

NOTE: Depending on the components you have selected, setting up Microsoft.Net Framework may move within the installation process.

1. The setup wizard for the Microsoft.NET Framework 4 starts The enduser license contract is displayed.



Activate the **I have read and accept the license terms**. check box and click on **Install**.

You need to reboot the system after the .NET Framework installation.

2. Click on **Next**.

   The system reboots. The setup process continues automatically.

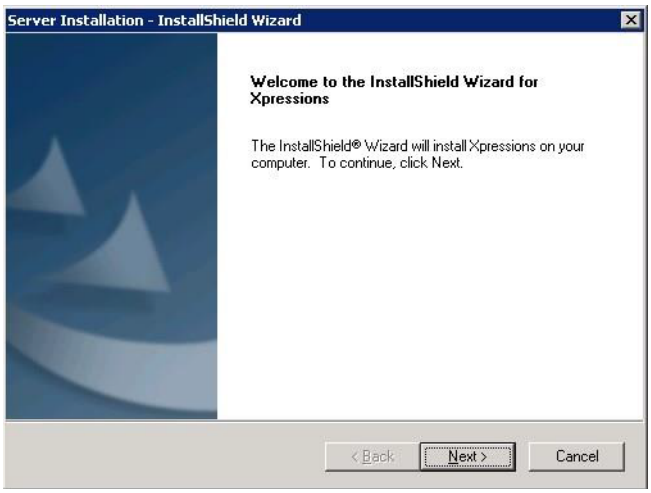
4.4 Installation of the XPR Server and Configuration of the Services

After you have selected the desired components for installation in Section 4.3, “Performing the Initial Installation”, on page 75 the corresponding services and software packets will now be installed.

NOTE: Via the **Cancel** button you may end the installation in all dialogs prematurely.

---

1. Up comes this dialog:



2. Click on **Next**.

   Up comes this dialog:

3. Verify that the installation target folder is on the cluster drive (typically r:).

   IMPORTANT: Be sure that the partition on which the XPR server software is installed has a minimum size of 10GB.

   The target path **must not** contain any blanks (e.g. `r:\OpenScape Xpressions\xpr`)!

   Never install the software on a local harddisk but exclusively on a cluster drive.

   ---

4. Then click on **Next**.

   A dialog follows in which you need to select the **XPR system components and services** to be installed (cf. Section 4.4.1, “Selecting Features”, on page 95).

4.4.1 Selecting Features

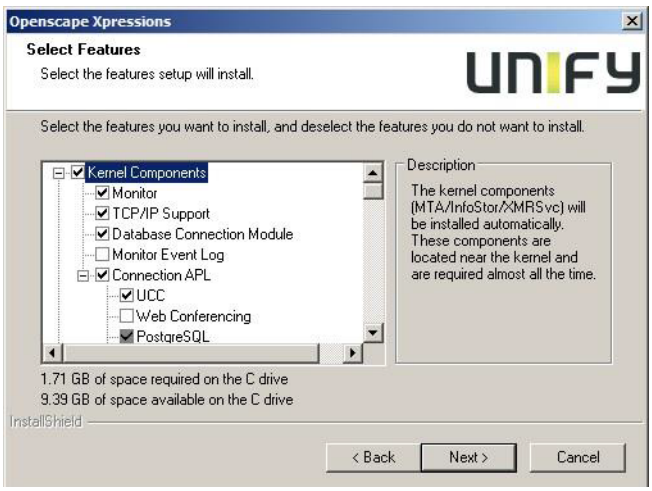
Based on the entered license keys and the hard and software installed in your computer, the setup wizard determines which components and services can be displayed and selected for installation in this dialog.

A component is also not displayed if an invalid license has been entered.

The XPR system components are thematically grouped. A group can be opened via the plus sign to display the components contained therein, and also be closed via the minus sign. Components indicated with a tick will be installed.

A component is selected with a mouse click on the box that precedes the entry. A mouse click on an already selected component cancels the selection, and consequently, this component will not be installed.

1. Up comes this dialog:



2. Select the components to be installed. The component selection is divided into the following groups.

   In the following table you find information about all server components and services. The **Corresponding APL** column in the table specifies the name of the Windows service that will be created by selecting the feature in the **Feature** column.

NOTE: All components not listed in the following table must not be selected or installed in case of the cluster installation. These components must be installed on satellites. Services installed here based on the feature selection must later be configured as resources according to the information in Table

12 on page 154 (for Windows Server 2008 R2 and Windows Server 2012 R2).

NOTE: Check the Release Notice, section “General Restrictions”, as to whether specific APLs have not been released at all (for example WE2XT APL).

Feature	Description	Corresponding APL
Kernel Components group		
Monitor	The XPR monitor serves to supervise the status and performance of the single XPR server components, and to display possible malfunctions. Furthermore, the single components are configured via the XPR monitor. The XPR monitor should always be installed. You can start the installed XPR monitor also later from a different Windows computer connected in the network. The corresponding installation directory is provided as “XPRMon“ share on the server PC for this purpose.	
TCP/IP Support	The installation of this network protocol is the basic requirement for the connection of the XPR clients with the server computer.	XPR TCP/IP Transport Layer(tcpApl)
Monitor Event Log	This software component is installed without user interaction; the application is integrated in the list of APLs to be started by the server automatically.	
Notification module	The Notification module is used to send server-generated notifications of new received messages (e-mails, faxes or voice mails) to telephone devices. Notification can be via MWI, SMS or a voice mail system call (User Outcall).	XPR Notification APL(NotApl)
Services group		
Webserver	• Web Assistant Using the Webserver module, you can install the web-based **Web Assistant** application, which enables users to access their mailbox via web browser. Furthermore, the Web Assistant offers comprehensive configuration options for the components of the XPR system. • **IppAssistant** Xpressions client IP Phone Assistant for OpenStage 60/80. • **System Info SNMP Agent** Installs the OpenScape Xpressions System Info SNMP Agent. This agent provides various system information about the SNMP protocol, which can then be displayed in the Common Management Platform. Precondition is an installed Windows SNMP service. You find more information in the *SNMP Agents* section of the *Server Administration* manual.	XPR Web APL(WebApl)

Tabelle 4-2 Selecting Features

Internet e-mail server	Besides the SMTP (Simple Mail Transfer Protocol) service the SMTP APL provides further services for sending and receiving e-mails via the Internet. The SMTP APL supports the protocols SMTP, POP3, IMAP4 and VPIM (to network voice mail servers). The SMTP APL requires a TCP/IP network protocol and a connection to the Internet on the computer. Furthermore, the Windows proprietary SMTP server must be uninstalled before the installation of the XPR system (see Section 2.1.3, “Checking the Windows Server 2003 Settings”, on page 22).	XPR Internet Mail APL(SMTP APL)
Fax server	Fax-on-Demand This option allows you to install a fax-on-demand server module. This module can be added as protocol within a Telematic APL. Subsequently, corresponding fax polling documents can be deposited.	
Voicemail server	A voice mail server is an IVR application, which is integrated in a Telematic APL as protocol. The following voice mail servers can be directly installed via the setup program: **Note:** **PhoneMail**, **VMS** and **ERGO must not** be installed parallel in the languages D, US and UK. • **Unified Messaging Voicemail (ERGO)** ERGO is the most modern type of a voice mail server and is particularly used for True Unified Messaging (cf. XPR *ERGO Voicemail System* manual). • **PhoneMail** PhoneMail as a telephone user interface is based on the PhoneMail originally developed on its own hardware in the US (cf. OpenScape Xpressions *PhoneMail* manual). • **VMS** VMS as a telephone user interface has been developed from the hardware based Hicom 300 version (cf. OpenScape Xpressions *VMS Voicemail System* manual). • **Voicemail (AMIS)** AMIS is an analog protocol for exchanging voicemails between voicemail servers. • **“Speech to Text”** Creates transcriptions of voice recordings via “Voicemail to Text”. The transcribed text is sent along with the voicemail.	
Pager	Supports sending notifications to a pager.	
Voice guide	Installs the VOGUE script that enables the automatic realization of a telephone exchange (Automated Attendant) as well as the generation of IVR applications, which allow controlling user functions by voice or dial tones (DTMF).	
Web Service Provider	SOAP web service provider	XPR Xml APL(XmlApl)
Single number	The Single Number feature can be used to reach the fax, voice and telephone numbers of a user via one single number.	
Short Message Service	Installs the SMS Connector that enables sending and receiving SMS messages.	

Tabelle 4-2 Selecting Features

Telematic hardware group (This selection is only displayed if the corresponding drivers have been installed.)		
ISDN hardware	The installed Sangoma ISDN boards are addressed by the ISDN hardware. Digital FaxG4 as well as analog FaxG3 is possible. A fax polling server can also be installed. Further options are voice mail server and XPR server/server interconnection via ISDN. **NOTE**: The IsdnApl can be installed on the cluster only without TTS and without ASR. An IsdnApl with TTS or ASR can be installed only locally on one or both nodes or on a satellite computer. TTS and ASR have been released only for specific operating systems and only on real hardware or on VMware ESX 4.0. Please refer to the *OpenScape Xpressions Release Notice* to see which operating systems have been released • **Fax G3 Post Dial** The FaxG3PD script enables sending fax documents to addresses with automated attendant solutions, even if extension information (direct inward dialing) is not available at the receiving station. Be sure to execute the steps described in after the XPR setup.	XPR Isdn APL(IsdnApl)
IP telephony	Voice-over-IP connection. Here, IVR applications can be linked with extension numbers, which are then addressed via Voice-over-IP. An IP APL can be operated in parallel to an ISDN APL on one computer. One IP APL cannot support two protocols of the infrastructure layer (e. g. H.323, CorNet-IP or SIP) in parallel. But the following scenarios are possible, for example, provided the protocols mentioned are supported by the connected PBX: • Parallel operation of Voice and T.38 Fax via H.323 • Parallel operation of Voice and T.38 Fax via SIP. • Parallel operation of Voice and G.711 Fax via H.323 • Parallel operation of Voice and G.711 Fax via SIP. You find details on this in the *OpenScape Xpressions Server Administration* manual. **NOTE**: The IpApl can be installed on the cluster only without TTS and without ASR. An IpApl with TTS or ASR can be installed only locally on one or both nodes or on a satellite computer. TTS and ASR have been released only for specific operating systems and only on real hardware or on VMware ESX 4.0. Please refer to the *OpenScape Xpressions Release Notice* to see which operating systems have been released	XPR ip APL(ipApl)
IP-/PBX integration group		
CTI Computer Telephony Integration	Connection for CTI client applications to various PBXs (see hardware compatibility list). This normally implies that the CTI link of the PBX is released and the corresponding CTI driver, probably to be obtained from the PBX manufacturer, have been installed beforehand.	XPR Cti APL(CtiApl)
CSTA protocol	This option installs the CSTA protocol interface.	XPR Csta Apl(CstaApl)
Messaging and directory integration group		

Tabelle 4-2 Selecting Features

LDAP directory synchronization	The LDAP directory synchronization must be installed for using the Active Directory Service in connection with the Microsoft Exchange 2003 Connector respectively Microsoft Exchange 2007 Connector.	XPR Ldap APL(LdapApl)
MS Exchange 2003 Connector	This component represents the gateway to Microsoft Exchange 2003.	XPR Exchange Connector for i386 (<XPR server name>: <Exchange 2003 server name>) Note: This is the Exchange APL.
MS Exchange TUM Connector	Additional connector that allows True Unified Messaging with a Microsoft Exchange 2003 or 2007 connection.	XPR Exchange UM APL
Lotus Notes gateway	These files contain the actual gateway to Lotus Notes. This gateway requires an installed Lotus Notes client of version 6 or later on the XPR server. **Attention:** Before you install the Lotus Notes gateway please execute procedures described in the OpenScape Xpressions *Lotus Notes Gateway* setup and administration manual.	XPR Lotus Notes APL(LNApl)
Lotus Notes rUM Gateway	Additional connector that allows True Unified Messaging in case of a Lotus Notes connection.	XPR Lotus Notes UM APL(LnUmApl)
MS Exchange 2007 Connector	This component represents the gateway to Microsoft Exchange 2007.	XPR Exchange Connector for i386 (<XPR server name>: <Exchange 2007 server name>) Note: This is the Exchange 2007 APL.
Presence support group		
Presence APL	The presence feature informs you about the system, telephone and work state of selected users and you can let other users know your work state. The Presence APL is also required for the web conference server and instant messaging with optiClient 130.	XPR Presence APL(PresenceApl)
CRM/ERP Integration group		
SAPconnect	This component installs the Unified Messaging gateway to SAP R/3 via the SAPconnect interface. **IMPORTANT**: Setting up this APL on a Windows cluster **has been released only project-specifically**.	XPR SAP R/3 APL (SapR3Apl)
SAPphone (CTI)	SAPphone is an interface under SAP RR/3 that provides the SAP users with CTI functions. The XPR SAPphone component serves as SAPphone server as well as SAPphone client. It converts function calls of the SAP system into XPR transactions for a CTI provider, e.g. the CTI APL. **IMPORTANT**: Setting up this APL on a Windows cluster **has been released only project-specifically**.	XPR SAPphone APL(SAPphoneApl)
ACD/Call-Center group		

Tabelle 4-2 Selecting Features

Virtual Machine (VM)	The VM APL includes a virtual machine to execute scripts that are implemented in the programming language E. For the call center functionality, the `ACD.e` E-script is executed in the APL.	XPR VM APL(VMApl)
Agent management	Installs the AMG script that enables call center agents to retrieve and change their current readiness state (log in, log off, ready, break) with a telephone call as well as details to their availability (e.g. their telephone numbers). Primarily, the AMG script is used with home agents who may only change their readiness state via telephone.	
ACDLoop	The ACDLoop script is a control system for waiting loops in a call center. It is needed if the waiting loop is not realized via the VOGUE script, but via UCD hardware of a HiPath 3xxx PBX.	
Question & answer	It is possible to establish a communication guide via the **Question & Answer** feature that is displayed as an HTML page in a browser for incoming calls on the screen of a call center agent. In this HTML page e.g. entries may be performed and stored in a database (e.g. a customer database in Microsoft Access format).	
Add-Ons/Tools group		
File interface	General file interface for creating gateways to other systems. Application cases are e.g. the pure fax gateway via SAPcomm to SAP R/3, the gateways to Novell Groupwise or HP Open Mail and the connection to HP Digital Sender.	XPR FileInterface APL(FiApl)
Print module	If you want to be able to specify an existing network printer as the output device for automatic copies of incoming and outgoing fax messages, you must select these files for the installation; the Print APL also allows you to print e-mails or fax messages from the telephone user interface.	XPR Printer APL(PrintApl)
V.24 support	These files are required if you want to operate protocols via analog modems. A possible application would be e.g. the activation of telephone LEDs to indicate new messages with several older PBXs.	XPR Serial APL(V24Apl)
Utilities	Some help programs that are installed in the directory *<XPR Install>\SDKTools*.	
'Lear' test module	Lear is a module to automatically transmit messages and transactions for testing purposes.	XPR Lear APL(Lear)
Print output management	Print Output Management . The LPR APL serves for outputting documents via the LPR protocol according to RFC 1179 to a large number of congenial printers or multi-purpose devices.	XPR Lpr APL(LprApl)

Tabelle 4-2 Selecting Features

3. Then click on **Next**.

   The dialog to select the directories for the **Database** and the **Document folder** follows (cf. Section 4.4.3, "Selecting the Folder for the Database and the Document Folder", on page 101).

4.4.3 Selecting the Folder for the Database and the Document Folder

In this dialog you specify the folder for the database and the document folder. For both folders, defaults are suggested.

IMPORTANT: The target path **must not** contain any blanks (e.g. `r:\OpenScape Xpressions\xpr`)! Verify that the document and database folder are located on the cluster drive.

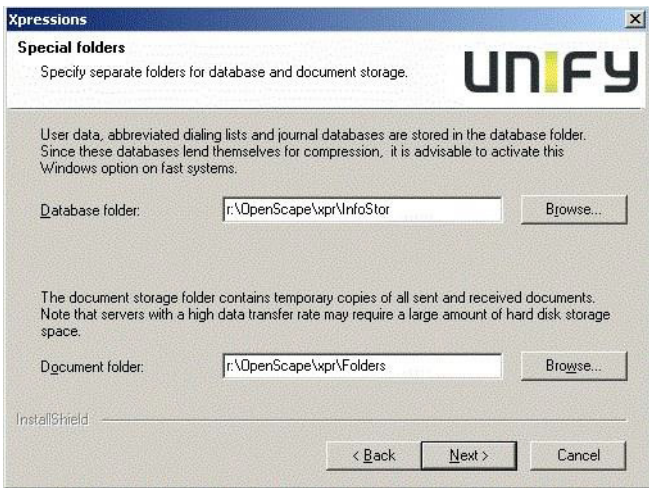
The **database folder** must be located a cluster drive and by no means on a local harddisk. This folder contains the database with user data, speed dialing and distribution lists.

The **document folder** must also be located a cluster drive and by no means be set to a local drive. All in and outbound documents are stored in the document folder. After a configurable period or when specific circumstances occur, the documents are automatically deleted.

NOTE: The size of the required harddisk memory depends on the number of in and outbound documents and on the period until documents are automatically deleted. Check in regular intervals, especially during the startup phase, whether harddisk memory is sufficiently available. If not, expand it.

---

1. Up comes this dialog:



2. In the **Database folder** field specify the database folder or accept the default. Via the **Browse...** button you can find a folder in the file system and select it.

3. In the **Document folder** field specify the document folder or accept the default. Via the **Browse...** button you can find a folder in the file system and select it.
4. Click on **Next**.

4.4.4 Login Account for XPR Services

The XPR components are started as services.

1. When you enable the **Assign an account to Xpressions services** check box, the XPR services need not be assigned to the logon account manually at a later date (see Section 2.6, “Assigning a Login Account for XPR Services”, on page 38).
2. Specify in the **User name** field the user account under which these services are to be started. This user account must comply with the requirements outlined in Section 4.3.2, “Creating a Login Account for XPR Services”, on page 76.

3. Specify this account's password in the **Password** field.
4. Click **Next**.

   The dialog to **select the default voice format** follows (cf. Section 4.4.5, “Selecting the Default Voice Format”, on page 104).

4.4.5 Selecting the Default Voice Format

In this step you set the coding used in your country for voice files. The following codings are available:

Coding	Description
A-Law	Mainly used in Europe.
µ-Law	Mainly used in the U.S., Canada, Mexico, Hong Kong, Japan, and Taiwan.

Tabelle 7

1. Up comes this dialog:

2. Select the A-Law option for the voice format.

   Please note that the registry key VoiceRecFormat of type REG_DWORD specifies the codec used by the IP APL for recordings. The following values are possible:

   - 0x02000000 (33554432): A-Law, sample rate 8 kHz, mono
   - 0x10000000 (268435456): µ-Law, sample rate 8 kHz, mono
   - 0xffffffff (4294967295): PCM (normal WAV), sample rate 8kHz, mono

   The last value is the default value.

   If you want to change the relevant default behavior, you need to manually create this key in the registry first.

   For further information about this key please refer to the *OpenScape Xpressions Server Administration* manual.

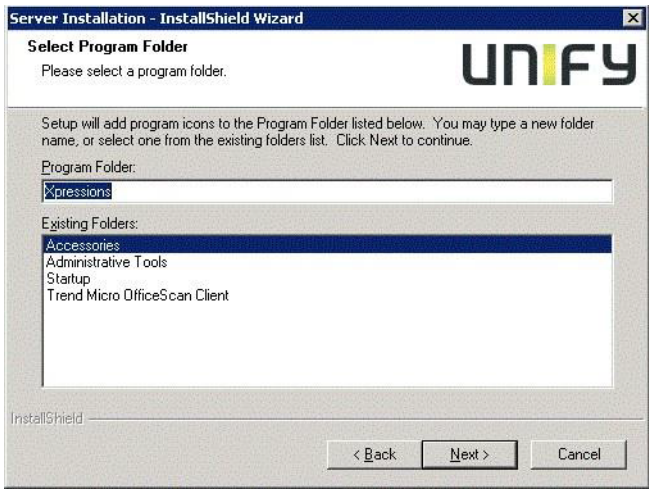
3. Then click on **Next**.

The dialog to select the program folder is displayed (cf. Section 4.4.6, “Selecting the Program Folder”, on page 105).

4.4.6 Selecting the Program Folder

The program folder is the store for the icons used to start and stop the XPR server and for the icon to start the monitor.

1. Up comes this dialog:



2. Enter the name of the desired program folder or accept the default.

   The **Existing Folders** field lists all program folders already available and, after you have made a selection, the XPR icons are stored in this folder. However, we recommend to accept the suggested description to simplify the system maintenance at a later date.

3. Then click on **Next**.

   The dialog to define the authentication method is displayed (cf. Section 4.4.7, “Configuring the User Authentication”, on page 106).

4.4.7 Configuring the User Authentication

OpenScape Xpressions offers two authentication methods for users to log on to the system:

Login via the Windows user account

This is the default method for installing the XPR server on a single server. If this method is applied, the user's Windows account is used for authentication against the XPR server. All password-specific functions in the XPR server are deactivated. After you have selected this option, the next installation step is to choose the Windows accounts to serve as XPR administrator or XPR postmaster.

IMPORTANT: Login via the XPR account cannot be changed retrospectively.

Login via XPR account (user name + password (PIN))

With this authentication method, user accounts for the XPR administrator and the XPR postmaster are created in the XPR database. It is still possible though to activate the authentication via the Windows user account for some users in hindsight. In the next installation step you need to specify a name and password for the administrator and the postmaster of the XPR server each (cf. Section 4.4.7.1, “Login via XPR Account”, on page 107).

1. Up comes this dialog:

2. Select the second option Login via Xpressions account (user name+password(PIN)) and click on **Next** >.

4.4.7.1 Login via XPR Account

If you have selected this authentication method, you need to specify names and passwords for the administrator and postmaster of the XPR server.

Both XPR users are defined in the XPR database and authenticate themselves in future via XPR mechanisms. You can switch to Windows authentication at a later date. Please read the corresponding chapter in the *OpenScape Xpressions Web Assistant* manual on this.

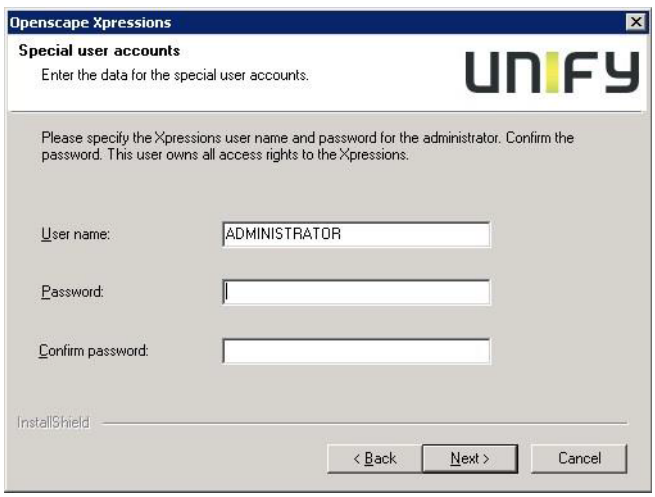
NOTE: The user accounts for administration and routing (see Setting up the User Account for the XPR Administrator on page 107) are not only stored in the database, but also saved encrypted in the Windows registry database. If the database completely fails (e.g. because of a harddisk crash), the information stored in the registry is used to recover such user accounts.

Belated password alterations are NOT maintained in the Windows registry database. The recovery after a complete failure always requires the password entered here.

Setting up the User Account for the XPR Administrator

The user account for the administrator is used for the configuration and later administration of the system. We recommend to keep the suggested user name.

1. Up comes this dialog:



2. In the **Password** field enter the password for the administrator account. Choose as complex a password as possible to avoid misusage of this account.
3. Re-enter the selected password in the **Confirm password** field to ensure that access will not be denied because of a typing error.

4. Click on **Next**.

   The dialog to set up the postmaster user account opens (cf. the following section).

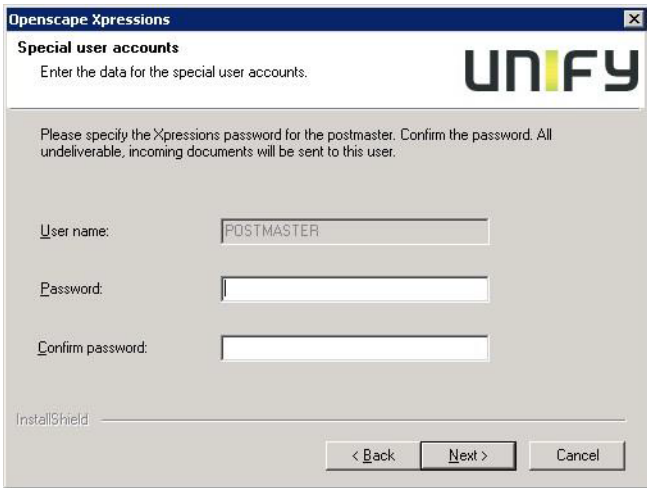
Setting up the Postmaster User Account

The postmaster contains all incoming documents that cannot be delivered because, for example, the address is incorrect. You can define so-called alarm rules that automatically send a copy of unread documents to the postmaster after expiration of a specific period (cf. section "Message Transfer Agent“ (MTA) of the *OpenScape Xpressions Server Administration* manual.

Via the user administration the postmaster must later be assigned a phone number (Voice) field so that users can divert to the postmaster from the telephone user interface (ERGO, PhoneMail or VMS).

You cannot modify the account name.

1. Up comes this dialog:



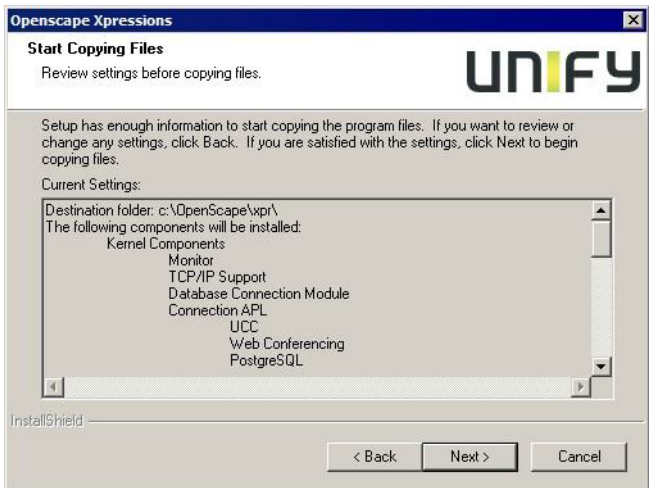
2. In the **Password** field enter the password for the postmaster account. Choose as complex a password as possible to avoid misusage of this account.
3. Re-enter the selected password in the **Confirm password** field to ensure that access will not be denied because of a typing error.
4. Click on **Next**.

   A dialog is displayed in which you can see a summary of your specifications and settings (cf. Section 4.4.8, “Summary of the Specifications and Settings”, on page 109).

4.4.8 Summary of the Specifications and Settings

In this dialog you can check the specifications and settings you have made in the previous dialogs.

1. Up comes this dialog:

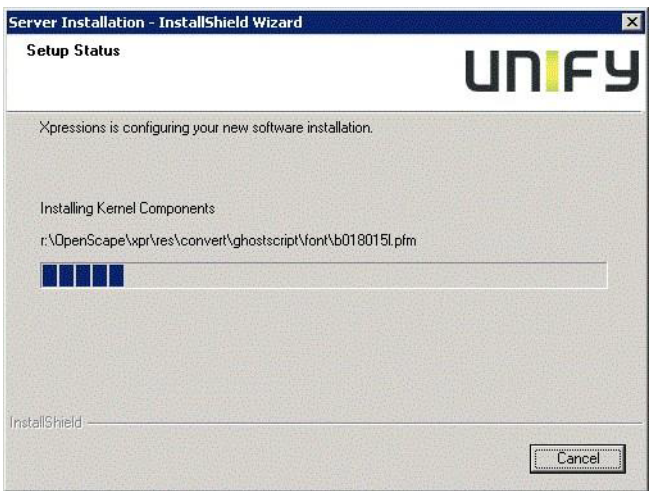


2. Check all settings and specifications for correctness.

   With a click on < **Back** you can return to already edited dialogs for correcting faulty settings or specifications.

3. Click on **Next** > when all specifications and settings are correct.

   Setup starts and the required files are copied. The installation status is displayed in the following dialog:



Please continue reading in Section 4.4.9, “Configuring the XPR Server Components and Services”, on page 110.

4.4.9 Configuring the XPR Server Components and Services

Some server components require an initial configuration during the installation, so that the XPR system can be started for the first time at all. As soon as the setup program starts with the installation of one of these components, you are prompted by dialogs to enter necessary configuration parameters for the respective server component.

The following table shows the server components that require an initial configuration:

Component	See description in
Configuring regional Connection Settings	Section 4.4.9.1, “Configuring regional Connection Settings”, on page 111

Tabelle 8

NOTE: Server components not configured during the installation (e.g. IP APL, ISDN APL, MTA), must be configured after the installation via the XPR monitor. You find detailed information about the configuration of single components in the OpenScape Xpressions Server Administration manual.

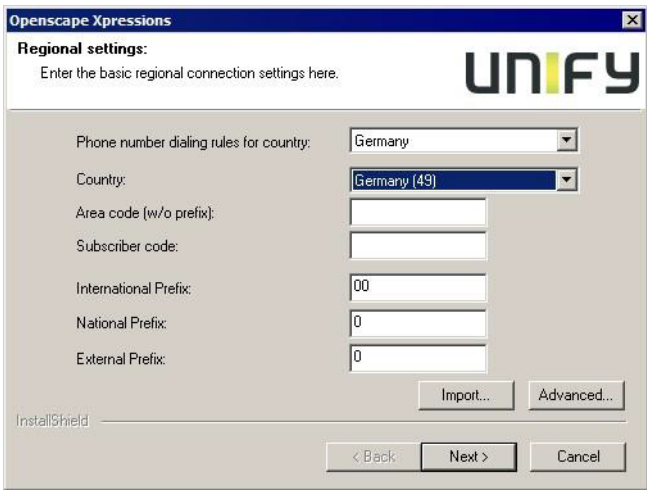
Between the server components that must be configured, components may be installed that do not require a configuration, so that you see the **Setup Status** dialog before configuration dialogs a displayed again.

The order in which the following sections appear corresponds to the sequence in which you are prompted to configure the above server components.

4.4.9.1 Configuring regional Connection Settings

The regional connection settings are used by the Telematic APLs or the CTI connection, but you can also configure them individually for each connection there.

1. The configuration of the regional connection settings starts with the following dialog:



2. In the **Phone number dialing rules for country** field select the country in which the system is located.

   Some of the other fields will then automatically be filled in with the corresponding default settings for the selected country.

3. Check whether the fields that were automatically filled in feature the correct connection settings.

NOTE: If the list does not contain the desired country, select a country that corresponds to the desired connection settings, or use the **General** option. When you select the **General** option, you need to fill in all fields of this dialog.

If they do not, modify the entries according to your requirements. Heed the following table:

Field/Button	Description
Country	Select your country from this list to determine the international country code.

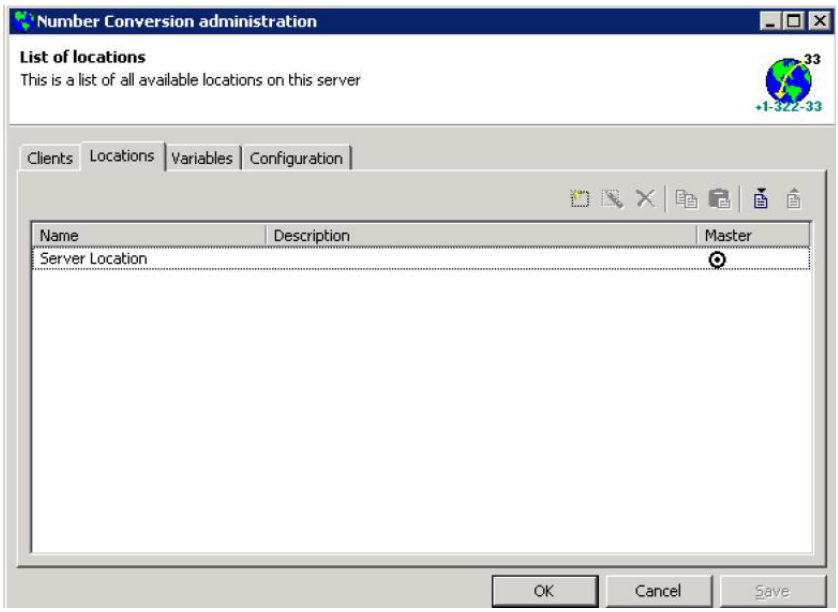
Tabelle 9

Field/Button	Description
Area code (w/o prefix)	Specify here the area code without prefix. In Germany this is the area code without the leading 0, in the US the area code without the leading 1. Example: 2404 from +49-2404-901-195
Subscriber code	Enter here the subscriber code of a phone number. Example: 901 from +49-2404-901-195 In the US this code is called Office Code.
International Prefix	Specify here the prefix for international calls. In the US this is 011, in Germany 00.
National Prefix	Enter here the prefix that is part of your area code. In Germany this is the leading zero of the area code, in the US this is the 1.
External Prefix	Enter here the external prefix.

Tabelle 9

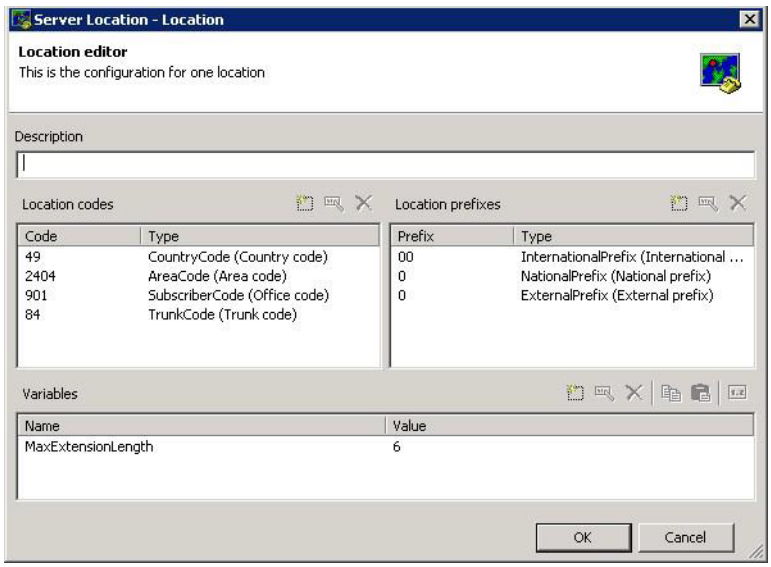
4. Specify in the **Area code (w/o prefix)** the code of the system location **without** prefix.
5. Specify in the **Subscriber code** field the subscriber code of the XPR server (Office Code for the US).
6. Click on the **Advanced...** button.

   The **Number Conversion Administration** dialog with a list of all locations opens:



7. Open the **Locations** tab.
8. Doubleclick the location entry that you want to edit.

   The **Location editor** opens:



9. Check and configure the correct range codes for the locations. If several subscriber codes are available you need to delete the **SubscriberCode (Office code)** entry. Instead, use **RangeCode (Number range)** to subsequently specify the subscriber codes with the corresponding DID ranges. How to specify a RangeCode:

   a) Click in the **Location codes** field with the right mousebutton and select the **Add** entry in the context menu. Then select the **RangeCode (Number range)** entry.

   b) A dialog opens for you to enter the data to the new RangeCode. Enter the corresponding values.

   c) Click on **OK** to save the number range settings.

10. Click in the L**ocation editor** on **OK**.

    You are taken back to the **Number Conversion administration** dialog.

11. Click on **OK** to save the changed location.

    You are taken back to the **Regional Settings** dialog.

12. Click in the **Regional Settings** dialog on Next.

4.4.9.2 Setup Wizard for the SMTP APL

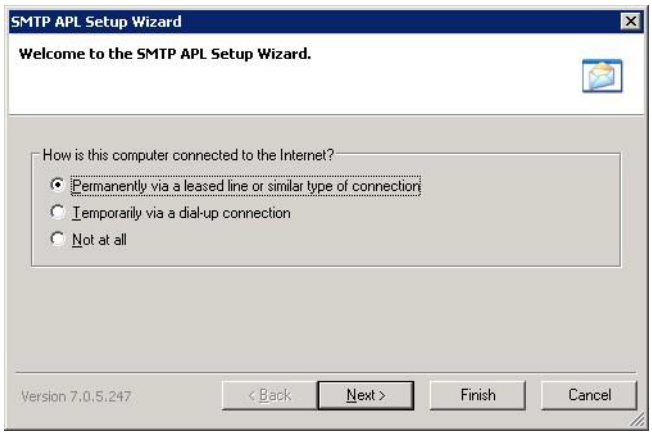
The SMTP APL provides the following services:

- sending and receiving SMTP messages via the Internet
- access for POP3 and IMAP4 clients,
- time-dependent import of messages with a POP3 server.

NOTE: So that the SMTP APL can be used, the SMTP service of the operating system must be stopped and deactivated. You find information on this in the documentation of the operating system.

---

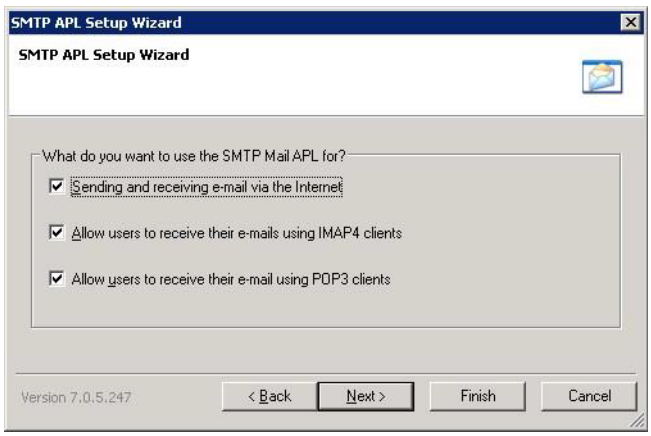
1. The SMTP APL setup starts with the following dialog:



2. Select one of the available options.

   When you select the **Not at all** option, e-mails can only be sent to other XPR server users.

3. Then click on **Next**. The dialog for selecting the usage option opens:



4. Select the options that you require. Please note the following table:

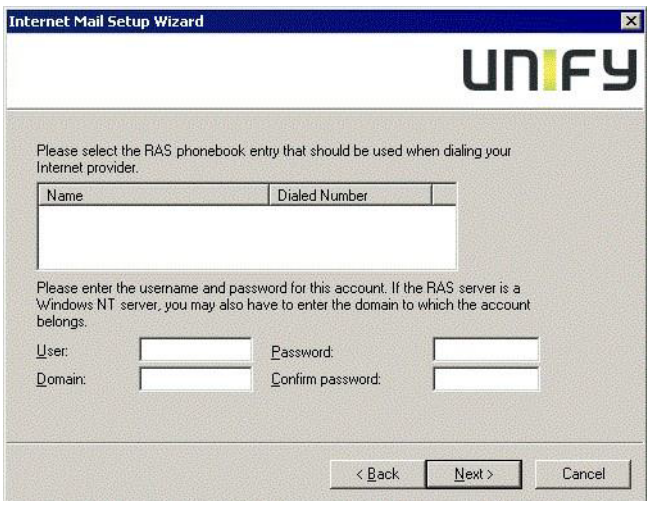
   The option **Sending and receiving e-mail via the Internet** assumes an existing internet connections. After you have selected this option you can send/receive internet mails to/from the XPR server via any client/gateway connection.

   The other two options in this dialog allow using POP3 or IMAP4 clients for accessing the XPR server. In case of a permanent internet connection this may occur e. g. from any computer with internet connection, but also locally within the proprietary network as client for the XPR server.

5. Then click on **Next**.

   If you have selected the T**emporarily via a dial-up connection** option in step 2 on page 114, the RAS service of the operating system is used to establish a PPP connection to a provider or to another Windows network.

   Up comes this dialog:



6. Select the RAS phone book entry and enter the user account with password that is needed for the connection.

   For a connection to a Windows RAS server the Windows-domain the user account belongs to must be entered.

7. Click on **Next**.

8. Click on **Finish**.

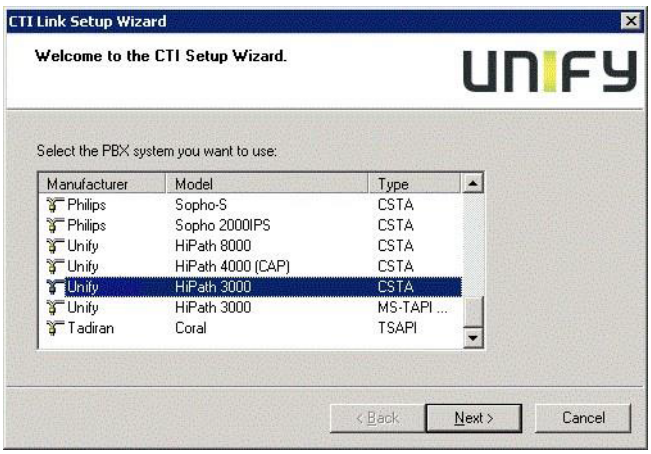
4.4.9.3 Installing and Configuring the CTI APL

The CTI APL provides different features for controlling and monitoring PBX systems and telephones. The most important ones are:

- Control of telephone devices (accept call, show display information etc.)
- Control of telecommunication connections (initiating the connection setup, conferences, “park calls”, “alternate” etc.)
- Monitoring telecommunication connections by setting monitor points within the PBX system
- Usage of all available features by other server components via the dialog/ transactions interface.

You find detailed information about the CTI APL in the *OpenScape Xpressions Server Administration* manual.

1. The CTI APL setup starts with the following dialog:



2. Deactivate all options in this dialog and click on **Next**.

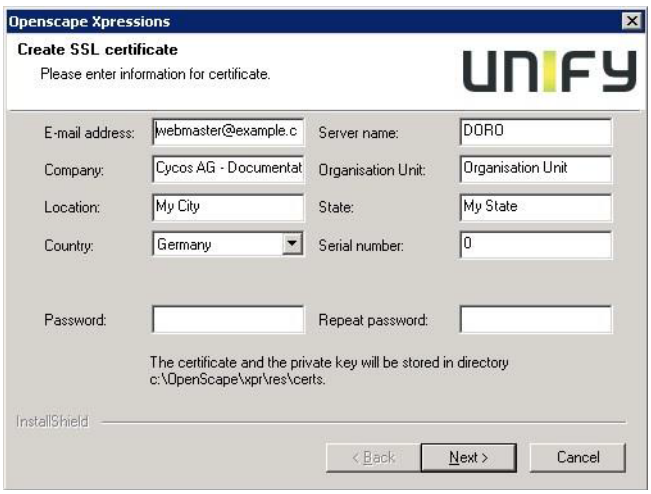
3. Click on **Finish**.

4.4.10 Creating the SSL Certificate

NOTE: If you want to use an individual certificate, please definitely make sure that the resulting files are coded with the Base64 method. All certificates coded in a different way lead to an error message in the XPR monitor and are not accepted.

The certificate created here enables the use of the HTTPS protocol with SSL encryption for the Web Assistant. The entire communication between client and server is encrypted.

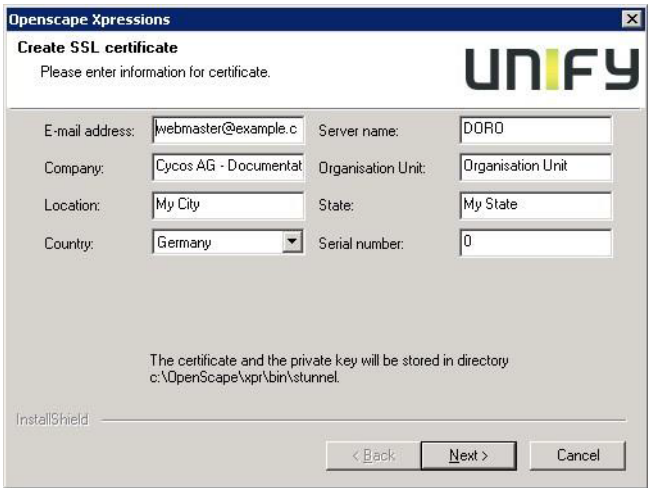
1. The creation of the SSL certificate starts with the following dialog:



2. In the dialog's fields make the specifications that are to become elements of the certificate.

IMPORTANT: The content of the **Server name** field is important for the certificate. Enter here the name of the computer that is specified as URL in an Internet browser to access the XPR server via the WebAssistant. This is typically the computer name of the XPR server. If an alias URL is configured in the proxy server for this computer, this alias name must be entered in the **Server name** field.

3. Specify a sufficiently complex password in the **Password** field.
4. Repeat the password in the **Repeat password**: field.
5. Then click on **Next**.
6. The creation of the SSL certificate for stunnel starts with the following dialog:



7. In the dialog's fields make the specifications that are to become elements of the certificate.

IMPORTANT: The content of the **Server name** field is important for the certificate. Enter here the name of the computer that is specified as URL in an Internet browser to access the XPR server via the WebAssistant. This is typically the computer name of the XPR server. If an alias URL is configured in the proxy server for this computer, this alias name must be entered in the Server name field.

---

8. Then click on **Next**.

4.4.11 XPR Server Software Installation finished

1. When you have completed the XPR server software installation, the following dialog appears:

2. Click on **Finish**.

   The server software installation is thus complete.

4.4.12 Installing the Language Packets

To install further language packets at a later date, start the Wrapper of the setup medium (`setup.exe` file in the `XpressionsInstall`) directory and select the new language in the corresponding dialog (cf. Section 4.3.6, “Selecting the Server Languages and the Default Language”, on page 84). Then continue with the setup.

IMPORTANT: This is not valid if the cluster is already integrated (seeChapter 2, “Cluster Integration”). If the cluster is integrated and you want to install another language, follow the instructions in the *OpenScape Xpressions Upgrade* manual.

NOTE: For each further language packet you wish to install you need another language license.

The setup programs of the language packets check whether licenses for the language-dependent components (Web Assistant and TUI) are available. If such licenses are found and you have selected these components during the XPR server installation, the language support for such products is installed fully automatically.

4.4.13 Setting Time Zones with stopped Services

If you do not want to activate/deactivate the time zone support, skip this section.

If you want to activate/deactivate the time zone support at a later date (see Section 2.7.5, “Time Zone Setting with Resources brought Offline”, on page 57), skip this section here.

The file `<XPR_Install>\bin\TimeZoneSupport.exe` controls the use of time zones in the XPR server. It has the effect that time stamps are adjusted in the database. You can obtain details about the time zone support from the administrator documentation *OpenScape Xpressions Server Administration*.

Execute this file only if you want to activate/deactivate the time zone support and no more and no fewer of the following XPR services are operating:

- XPR License Service(licsvc)
- XPR Name Locator (nameloc)
- XPR Configuration Service (cfgsvc)
- XPR Status Dispatcher (xmrsvc)
- XPR Information Store (infostor)

How to stop the XPR services:

1. Click on **Start > WindowsAdministrative Tools > Services**.

   The service management opens.

2. Search for all service names that begin with XPR.

3. Click with the right mouse button on the XPR service to be stopped and select from the context menu **Stop Service**.

4. Repeat step 3 for all XPR services to be stopped.

   Continue with the following steps:

5. Open a command prompt. This may be a normal command prompt or one in the cluster context (see Section 2.8.1, “Creating a Command Prompt as Resource”, on page 62).

6. Navigate to the `<XPR_Install>\bin\` directory.

7. If you want to activate the time zone support, enter the following command:

   `TimeZoneSupport.exe on`

8. If you want to deactivate the time zone support, enter the following command:

   `TimeZoneSupport.exe off`

9. Reboot the XPR services you stopped in step 4 by clicking them with the right mousebutton in the service management and selecting **Start Service**.

10. Close the service management.

NOTE: You need to execute the file `<XPR_Install>\bin\TimeZone-Support.exe` on one cluster node only. It need not be executed again on another node. The changes it causes in the database are replicated to another node in the course of a replication.

4.4.14 Setup Completion

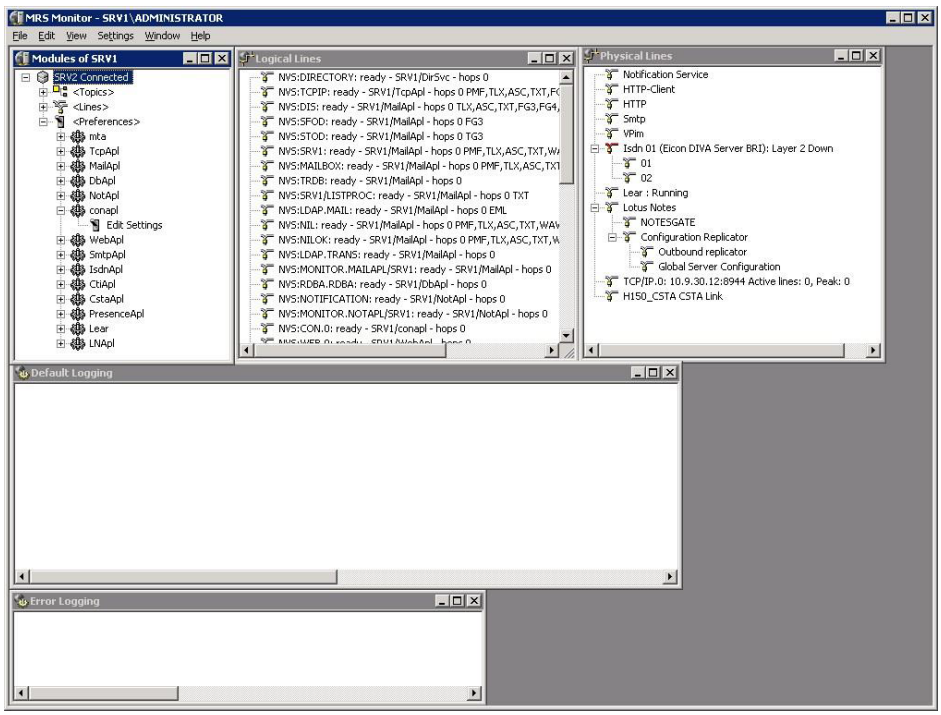
A successful completion of the Component Installer is displayed in the following dialog.

Disable all options and click on **OK**.

4.4.15 Checking Fax G3 Post-Dialing

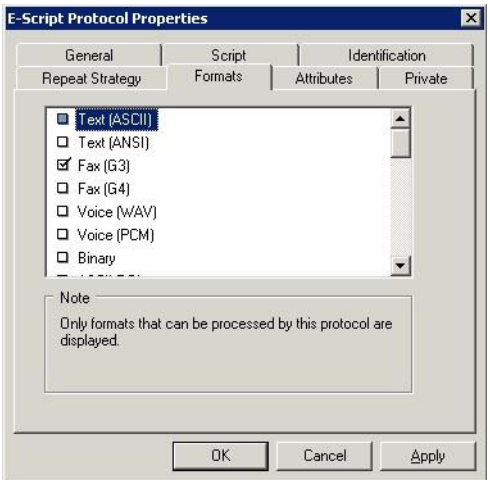
If you have activated the Fax G3 Post Dial option of the **Telematic Hardware** group in Table 4-2 on page 96 in Section 4.4.1, “Selecting Features”, on page 95, you need to check whether the following configuration steps have been executed when configuring the ISDN APL (see administrator documentation *OpenScape Xpressions Server Administration*):

1. Open **Start > All Programs > XPR > Monitor - System Logging**.



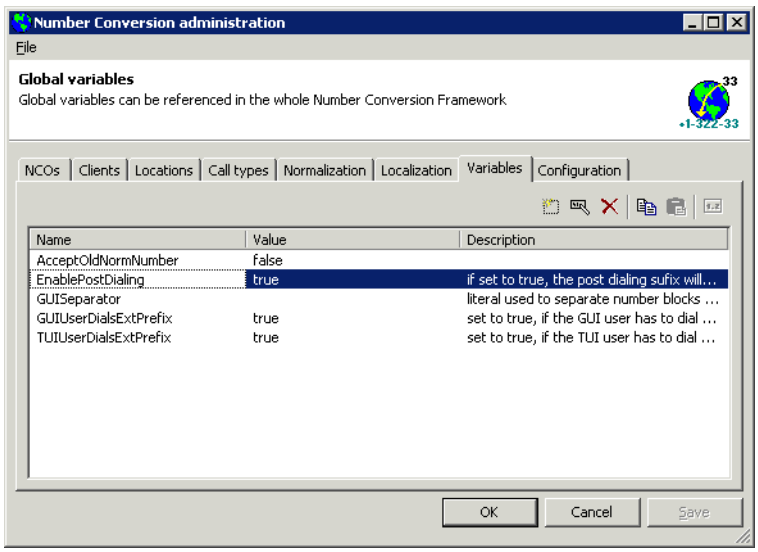
2. In the **Modules of <XPR server name>** section double-click **<Preferences> >ISDNApl > Advanced Settings**.

3. Double-click the entry of the Fax G3 protocol on the **Protocols** tab.



4. Verify that only the **Fax (G3)** check box is active and all other entries are disabled.
5. Click on **OK**.
6. Click on the **Devices** tab.
7. Click on the **NCO Administration** icon and then on the **Variables** tab.

   You can also click on **OK**, start the file `<XPR_Install>/bin/NumberConversionAdmin.exe` and click on the Variables tab. The dialog then open is a copy of the above one but features additional tabs.



8. Verify that the **EnablePostdialing** variable has value true.
9. Click on **OK**.

10. Click on **OK**.

4.4.16 Voice Conferences with SIP

If you use SIP (port 5060) in the IP APL and voice conferences with SIP, configure two IP addresses. See the section “SIP Configuration” in the administrator documentation *OpenScape Xpressions Server Administration* for details.

5 Cluster Integration

5.1 Checklist for Preparing the Cluster Installation

Step
1. Section 5.2, “Configuring the Resource XPR Information Store Res”, on page 128
2. Section 5.3, “Reassignment of the Computer Name in the Registry”, on page 129
3. Section 5.4, “Installing common System Components”, on page 133
4. Section 5.5, “Modifying Xpressions Services”, on page 140
5. Section 5.6, “Configuring local Shares as Resource”, on page 147
6. Section 5.7, “Configuring XPR Services as Resources”, on page 152
7. Section 5.8, “Replicating XPR Services as Resources to the second Node”, on page 179
8. Section 5.9, “Testing the XPR Server in the Cluster”, on page 186
9. Section 5.10, “Satellite Environment with clustered Kernel Computer”, on page 188

Table 10 Checklist for Preparing the Cluster Installation on Windows Server 2008/2012

5.2 Configuring the Resource XPR Information Store Res

1. Copy the `mrsclusres.dll` file from the `XpressionsInstall\AddOn\Misc\Cluster\x64` directory for a 64-bit operating system on the XPR setup medium into the `%WindowsInstallDir%\cluster` directory on both nodes.

   If Windows does not permit this because of the *File in use* message, stop the cluster service before copying and reboot it after copying.

2. Start command prompt on the first node. Execute the following command in it:

   ```
   cluster resourcetype mrsclusres /create /dll:mrsClusRes.dll
   ```

   If the command was executed correctly, the output reads as follows:

   ```
   Resource type 'mrsclusres' created
   ```

   This registers the resource type mrsClusRes with the cluster. Resources of this type can now be created.

3. Close the command prompt.Section 5.7.3, “Creating the Resource XPR Information Store Res”, on page 171

4. We recommend to set the second node to **Pause** by the following substeps to prevent a possible failover.

   a) Open the Failover Cluster Management under **start > Programs > Administrative Tools > Failover Cluster Management**.

   b) Rightclick **Nodes** > **<name of the second node>** in the left-hand section.

   c) Select the **Pause** option.

5.3 Reassignment of the Computer Name in the Registry

All installation steps so far were first performed on a local system and with the server name of the local node. But because the XPR server is to be executed as cluster server, all appearances of the local-node name in the registry key folders `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Siemens` and `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM` must be replaced with the name of the virtual XPR machine.

The name of the virtual machine was created in step 3 on page 40 as network name and appears in the middle section of the Failover Cluster Management in the category **Server Name** as **Name:<network name>**.

The state of the second node is not important.

IMPORTANT: Very important! When executing the next steps be sure to replace the computer name **only in the two mentioned registry folders `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\SIEMENS` and `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM`**.
In all other registry folders the local computer name must definitely be maintained, since otherwise the Windows operating system may not work any more. If required, create a backup copy of the registry before changing keys in it.

---

1. Start the registry editor. Click on **Start > Run**. Enter the **regedit** command in the **Open** field.

   The registry editor starts.

2. Execute the following substeps to replace the name:

   a) In the **Edit** menu click on the **Find...** option. The **Find** dialog opens.

   b) In the **Find what** field enter the computer name of the local node. Activate the options **Keys**, **Values** and **Data**. Click on **Find next**.

   The next occurrence of the computer name is displayed.

   c) If you are in the registry folder `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Siemens` or `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432\PP-COM` (see status bar), replace the local computer name with the value of <network name> in **Name:<network name>** in the category **Server Name** in the middle section of the Failover Cluster Management.

   More changes may have to be performed in a key.

   Example:

   The key

   `HKLM\SOFTWARE\Wow6432Node\PP-COM\MRS\xmrsvc\ModuleCache`

   of type REG_MULTI_SZ has e. g. the following value:

```
XMR,
infostor,pipe://\\KERN1\pipe\MrsInfoStorIPC
mta,pipe://\\KERN1\pipe\MrsRouterIPC
...
```

Value `KERN1` must be replaced here in all positions.

More changes may have to be performed in a key. If, for example, XPR is the name of the XPR server in the cluster system, `TLCLKN1` is the name of the node in the cluster, and the key

`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\MRS Globals\Monitor Directory`

has, for example, the two-line value

```
\\XPR\MrsMonitor
\\TLCLKN1\MrsMonitor
```

, the second line must be removed without substitution.

NOTE: Do not replace the name of the local computer with the application's name.

---

d) Push key F3 to find the next appearance. In doing so be sure not to leave the above registry folders.

e) Repeat the last two substeps c and d until all appearances of the computer name of the local node have been replaced.

3. Replace the IP address that is part of the key

`HKLM\SOFTWARE\wow6432Node\PP-COM\MRS\MRS Globals\LicSvcAddress`

in the registry with the IP address of the virtual XPR server (value of <IP address> in **IP Address:<IP address>** in the category **Server Name** in the middle section of the Failover Cluster Management).

Example value for the above key:

`tcpip://172.26.209.43:13010`

4. The following key must be empty:

`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\Services\Kernel`

Remove all APL entries. Compare Section 5.10, “Satellite Environment with clustered Kernel Computer”, on page 188

5. In the registry folder

`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\Tcpapl\NWPlugTCP`

set the value of key BindAddress to the IP address of the virtual XPR server (value of <IP address> in **IP Address:<IP address>** in the **Server Name** category in the middle section of the Failover Cluster Management).

If the **BindAdress** key does not exist, create it (type REG_SZ).

6. Check in the registry whether the following key of type `REG_SZ` has value `MSCS` (Microsoft Cluster Server):

`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\Cluster Parameter`

Name: Type

Type: REG_SZ

Data: MSCS

If the key does not exist yet, create it.

7. Check in the registry whether the following key of type `REG_SZ` has the value you assigned in step 4 on page 37 to the name of the application (example `UMKernel`):

`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\Cluster Parameter`

Name: Group

Type: REG_SZ

Data: <Application name>

If the key does not exist yet, create it.

8. Check that no further entries are available for the clustered kernel computer in the key `HKLM/SOFTWARE/PP-COM/MRS/Services/Kernel`.

Supposed, the network name of the clustered kernel computer reads `XPRCL`, the `NameLoc,XPRCL` must not be present in the following example:

```
NameLoc,XPRCL
NameLoc,SATEL1
CfgSvc,SATEL1
NameLoc,SATEL2
CfgSvc,SATEL2
```

IMPORTANT: Verify that the commas are not followed by blanks.

9. Close the registry editor and continue the XPR server installation.

5.4 Installing common System Components

5.4.1 Installing “Prerequisites“ on the Nodes

To operate the XPR server as cluster server, specific system components must be locally installed on each further node on which the installation shall be performed.

1. Connect the setup medium used to the node.
2. Search the `XpressionsInstall\Prerequisites\` directory on the setup medium for the following files:

   a) `vcruntimeinst.exe`

   b) `vcredist_x86.exe`

   c) `vcredist_x64.exe`

   d) `vc9\vcredist_x86.exe`

   e) `vc10\vcredist_x86.exe`
3. Start these files on the node.

   NOTE: No dialog window will be displayed announcing the end of the execution of this file.
4. Repeat the previous steps 1 on page 133 to 3 on page 133 on each node on which the XPR server is to operate in the cluster.

5.4.2 Installing Printer Drivers on the Nodes

Another system component to be locally installed are the XPR printer drivers. They must also be installed on all further nodes on which the XPR server is executed in the cluster. A cluster enables installing a printer driver on the cluster by creating a cluster resource called “Print Spooler”. This cluster resource must not be created and used.

NOTE: The installation of the printer driver requires a computer reboot. Verify that no critical applications have been started on the computer respectively can be rebooted.

Proceed as follows:

1. Connect the setup medium to the node and start the setup.exe file in the following directory on the setup medium:

   `XpressionsInstall\AddOn\Misc\Cluster\x64\`

   NOTE: Start under **Windows Server 2008/2012 R2 64 bit** the setup.exe file in the following directory:
   `XpressionsInstall\AddOn\Misc\Cluster\x64\`

2. Click on **Next**.
3. Read the license conditions, activate the **I accept the terms in the License Agreement** checkbox and click on **Next**.
4. Click on **Install**. Setup is performed and you can see the progress in a dialog.
5. Click on **Finish** to complete the installation.
6. Restart the computer.
7. Open the file `C:\WINDOWS\Temp\ucsetup.log`. In this file you find log entries that indicate whether the printer driver was duly installed.
8. Perform the steps 1 to 7 on each node.

5.4.2.1 Uninstalling the Printer Driver

How to uninstall the printer driver from the system at a later date:

1. Connect the setup medium to the node and start the setup.exe file in the following directory on the setup medium:

   `XpressionsInstall\AddOn\Misc\Cluster`

2. Click on **Next**.
3. Click on **Remove**.
4. Click on **Remove**. The uninstallation starts.
5. Click on **Finish**.
6. Perform the steps 1 to 5 on each node.

5.4.3 Installing Printer Embedded Codes

Execute the following steps to install Printer Embedded Codes:

1. Create a new directory on the cluster drive, for example `R:\pec_spool`.
2. Executing the following sub-steps, grant every user full access to this directory to enable the XPR server to access the PostScript files.

   a) In the Windows Explorer, click this directory with the right mouse button and select the **Properties** menu option.

   b) Click on the **Sharing** tab.

   c) Click on the **Advanced Sharing...** button.

   d) Activate the **Share this folder** check box.

   e) Click on the **Permissions** button.

   f) Select the **Everyone** entry in the **Group or user names** field.

   g) Activate in the **Permissions for "Everyone"** field the **Allow** check box for the **Full Control** entry.

   h) Click on **OK**.

   i) Click on **OK**.

   j) Click on **Close**.

   You can open the shared folder in the Windows Explorer running on another computer in the network e. g. as follows:

   ```
   \\<IP address of the virtual server>\pec_spool
   ```

   IMPORTANT: Replace `<IP address of the virtual server>` with the IP address of the virtual server but **not** with one of the following values (see the note in Section 2.1.2, "Client Access Point (Virtual Server)", on page 18):
   - Cluster IP address
   - IP address of one of the two nodes to the client network
   - IP address of one of the two nodes for the internal cluster connection (Interconnect)
   - Network name of one of the two nodes

3. Now execute step 1 on page 147 to step 8 on page 149 in Section 5.6.1, "Setting the Share Resource Privileges of the XPR Server on Windows Server 2008/2012", on page 147 with the values in the following table:

Share name	Path	User group	Privileges
<Name>	[LW:]\pec_spool	Everyone	Full control

Replace <Name> with any value.

NOTE: The instructions in Section 5.6.1, “Setting the Share Resource Privileges of the XPR Server on Windows Server 2008/2012”, on page 147 will later (not now!) be executed with the values in Table 11 on page 147.

---

4. On every client computer to use these Printer Embedded Codes you must install a specific **local** printer by executing the following sub-steps.

NOTE: Depending on the operating system used, these sub-steps may vary.

---

a) Open **Start** > **Devices and Printers**.

b) Click on the **Add a printer** menu option.

c) Click on the **Add a local printer** button.

d) Select value **XPR Server Fax Monitor** in the **Use an existing port** field.

e) Click on **Next**.

f) If you install the printer on Windows XP or Windows Server 2003, select printer **HP LaserJet III PostScript Plus v2010.118**.

If you install the printer on Windows Vista, Windows 7, Windows Server 2008 or Windows Server 2008 R2, select printer **HP LaserJet 2300 Series PS**.

If you install the printer on Windows Server 2012, select printer **HP Universal Printer Driver**. You can download the printer driver from `ftp://ftp.hp.com/pub/softlib/software12/COL40842/ds-99376-4/upd-ps-x64-5.6.0.14430.exe`, for example.

g) Click on **Next**.

h) Enter a name ending in `EC` (for example `XPR EC`) for the printer.

IMPORTANT: The `EC` in the printer name must be preceded by a blank (see above example).

---

i) Click on **Next**.

j) Activate the check box **Do not share this printer** and click on **Next**.

IMPORTANT: Following the instructions, configure the printer **at any rate** as local printer (do **NOT** share this printer).

---

k) Click on **Finish**.

l) Click the printer with the right mouse button and select **Printing Preferences**.

NOTE: Depending on the operating system you need to select **Properties** > **General** > **Printing Preferences**.

---

m) Click on the **Advanced** tab.

n) Set **Document Options** > **PostScript Options** > **PostScript Output Options** to value **Optimize for Portability**.

o) Click on **OK**.

IMPORTANT: You must use a Courier font to make embedded codes legible for the Mail APL.
If you use other fonts, the printer driver writes texts as binary code in the created PostScript file and the Mail APL cannot read the embedded codes anymore.

---

5. Executing the following sub-steps, you must set values in the registry on each **client computer** to use these Printer Embedded Codes for the newly configured printer to know where the XPR and the shared directory is found.

NOTE: Execute such sub-steps **neither** on the active **nor** on the inactive node!

---

a) Open **Start** > **Run**.

b) Enter `regedit` and click on **OK**.

c) Open the key [1] `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\FaxMon\DefaultDir`.

If this key does not exist yet, create it (type REG_SZ).

d) Enter as value of this key the UNC path of the directory you shared in step 2 on page 135 on the cluster.

Example:

1. Use on 64-bit operating systems `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\...` instead of `HKEY_LOCAL_MACHINE\SOFTWARE\...`.

e) `\\<IP address of the virtual server>\pec_spool`

IMPORTANT: Replace `<IP address of the virtual server>` with the IP address of the virtual server but **not** with one of the following values (see the note in Section 2.1.2, “Client Access Point (Virtual Server)”, on page 18):
- Cluster IP address
- IP address of one of the two nodes to the client network
- IP address of one of the two nodes for the internal cluster connection (Interconnect)
- Network name of one of the two nodes

---

f) Open the key[1] `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\FaxMon\MailApl_FaxPipe_Host`.

If this key does not exist yet, create it (type REG_SZ).

g) Enter as value of this key the IP address or the network name of the virtual server.

IMPORTANT: Enter **none** of the following values (see note in Section 2.1.2, “Client Access Point (Virtual Server)”, on page 18):
- Cluster IP address
- IP address of one of the two nodes towards the client network
- IP address of one of the two nodes for the internal cluster connection (Interconnect)
- Network name of one of the two nodes

---

6. Set the following registry key[1] to value `0x00000001`:

   `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MailApl\SupportEC`

   If the key does not exist, create it (type REG_DWORD).

   The Mail APL evaluates the embedded codes in the print output of the PostScript code and replaces them with blanks in the hardcopy.

7. Set the following key[1] in the registry **of the active node** to value `0x00000001`:

   `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MailApl\SupportEC`

   If the key does not exist, create it (type REG_DWORD).

1. Use on 64-bit operating systems `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\...` instead of `HKEY_LOCAL_MACHINE\SOFTWARE\...`.

5.4.4 Setting System Variables on the Nodes

The system variables Path and two system variables for Ghostscript must be extended respectively set on all further nodes on which the XPR server is executed in the cluster.

1. Click on **Start > Settings > Control Panel**.
2. Click on the **System** entry.
3. Click on the link **Advanced system settings**.
4. Click on the **Environment Variables** button.
5. Extending the Path system variable
   a) Doubleclick the entry of the **Path** variable in the **System variables** section.

   IMPORTANT: Verify that you modify the **Path** variable in the **System variables** section and not in the **User variables** section.

   b) Place the cursor at the end of the **Variable value** field.
   c) Insert a semicolon.
   d) Enter a value analog to the following path:

   `r:\OpenScape\XPR\bin;r:\OpenScape\XPR\SDKTools`.

   In this path, `r:\OpenScape\XPR\` is the directory of the XPR on the cluster drive (see step 4 on page 49).
   e) Click on **OK**.
6. Setting the system variables for Ghostscript.

   Ghostscript should no longer be used.

   In order to avoid any vulnerabilities or any conversion issues using Ghostscript, please delete the contents from `res\convert\ghostscript` folder and use the **DisableGS** registry key as documented on section E.1.3 of the Server Administration manual
7. Perform the steps 1 to 6 on each node.

5.5 Modifying Xpressions Services

Before you can perform the cluster integration, all XPR services must be stopped on the node on which the XPR installation was performed.

IMPORTANT: The application for the XPR server must not have been shifted between the nodes at this point.

5.5.1 Setting Xpressions Services to manual

1. Click on **Start > Programs > Administrative Tools > Services**.

   The service management opens.

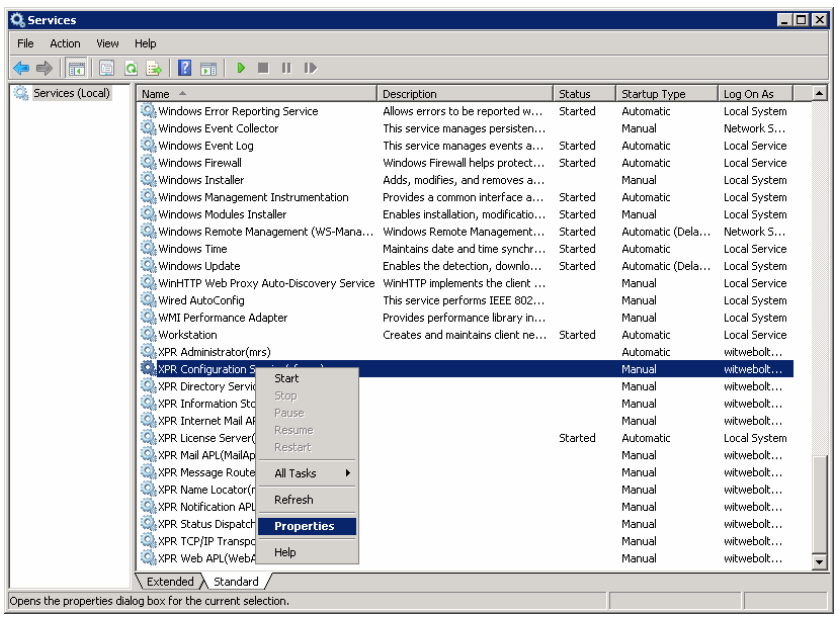
2. Find the following services:

   - XPR Administrator (mrs)
   - XPR License Server(licsvc)
   - stunnel

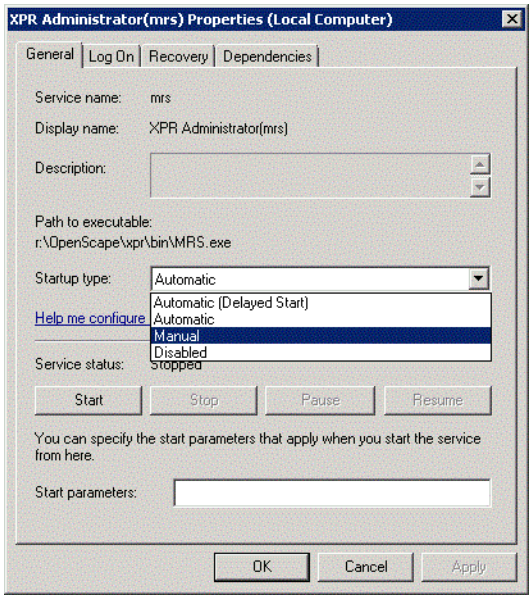
3. Click with the right mouse button on the service XPR Administrator(mrs) and select **Stop** from the context menu.

4. Set the service to manual start.

   a) Click with the right mouse button on the service and select **Properties** from the context menu.



The **Properties** dialog opens:



b) In the **Startup type** field select the **Manual** option.

c) Click on the **OK** button to close the dialog

5. Repeat steps 4a to 4c for the services XPR License Server(licsvc) and stunnel.

5.5.2 Assigning a Login Account for XPR Services

Check whether the following conditions have been met:

1. A login account for the XPR services has been created (see Section 4.3.2, “Creating a Login Account for XPR Services”, on page 76).
2. In step 1 on page 97 the **Assign an account to Xpressions services** check box has been activated.
3. You do not want to install a Microsoft Exchange server on the cluster.

If all of these conditions have been met, check in the service management whether for all XPR services the **Log On As** column displays the user name you desire and skip all further instructions in this section.

If only conditions 1 and 2 have been met, you need to execute the following instructions of this section only for the Exchange services. In doing so, you need to enter a special user account (see below and the installation and administrator documentation *OpenScape Xpressions Microsoft Exchange Gateway*).

If conditions 1 and 2 have not been met, execute the following instructions of this section.

So that the required XPR services can be operated in the cluster context, they must be started with a user account that exists on all nodes of the cluster and gives identical privileges. This account must be created by the local network administrator and furnished with the required privileges.

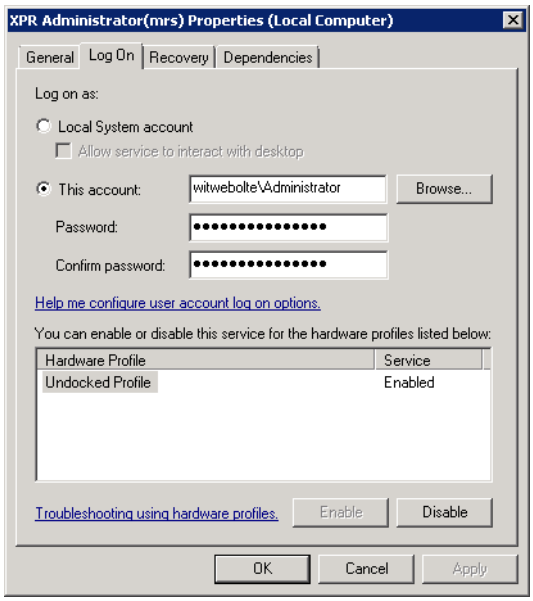
The user account created for executing the services must at least fulfill the following conditions:

- The user must be a domain user and belong to the same domain in which the XPR server is installed.
- All services and APLs that operate under this user must receive the privilege *Logon as Service*.
- The user must be available on all nodes on which the XPR server is installed.

IMPORTANT: If you also install the services **XPR Exchange Connector for i386 (<XPR server name>:<Exchange server name>)** or **XPR Exchange UM APL** in the cluster, a user account with further special privileges must be used for these services instead of the above one. The setup and administrator documentation *OpenScape Xpressions Microsoft Exchange Gateway* delivers comprehensive details on the required privileges under the term **Service Account**. Please keep in mind that setting up the Exchange connection requires more privileges than operating it.

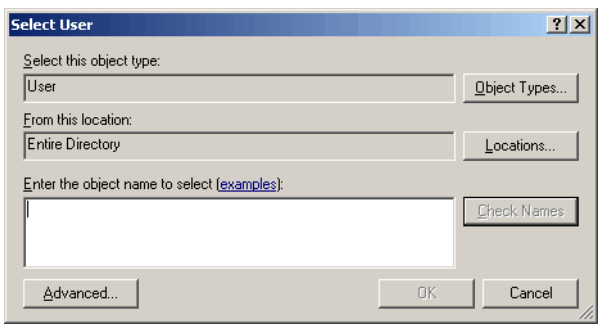
---

1. Open the service management. To do this, click on **Start > Programs > Administrative Tools > Services**.
2. Verify that all XPR services are disabled (offline) (cf. Section 5.5, “Modifying Xpressions Services”, on page 140).
3. Click with the right mouse button on the first available XPR service, for example XPR Administrator(mrs). In the context menu select the **Properties** option and then switch to the **Log On** tab.



4. Select the option **This account**.
5. Click on the **Browse...** button to look for the XPR services user account defaulted by the network administrator.

   The **Select User** dialog opens.



   a) In the **Object Types...** list select the *User* object type.

   b) Click on the **Locations...** button to use either a local user account or a user account from a domain.

   c) In the **Locations** window select the appropriate computer or the corresponding domain.

   d) Click on the **OK** button to return to the **Select User** dialog.

   e) Click on the **Check Names** button to look for user accounts.

   f) In the **Enter the object name to select** field enter the beginning of the user name.

   g) Click on the **Check Names** button.

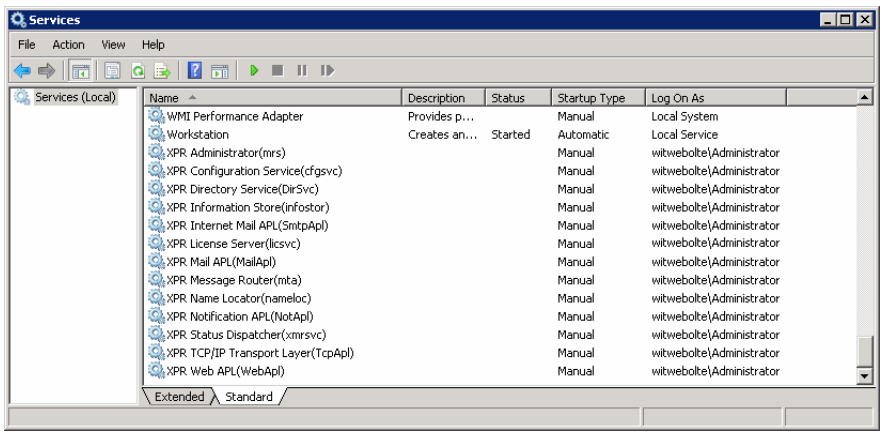
      The bottom list displays the user accounts found.

h) Select the user account defaulted by the network administrator for the XPR services in the **Enter the object name to select** field and click on **OK**.

IMPORTANT: If you execute this step for the services **XPR Exchange Connector for i386 (<XPR server name>:<Exchange server name>)** or **XPR Exchange UM APL**, please heed the above special requirements on the privileges of this account.

---

6. The **Log On** tab displays the selected user. In the **Password** and **Confirm password** fields enter the password for this user account.
7. Click on **OK** to copy the settings.
8. Repeat steps 1 on page 142 to 7 on page 144 for each further XPR server service.



5.5.3 Removing Xpressions Service Dependencies

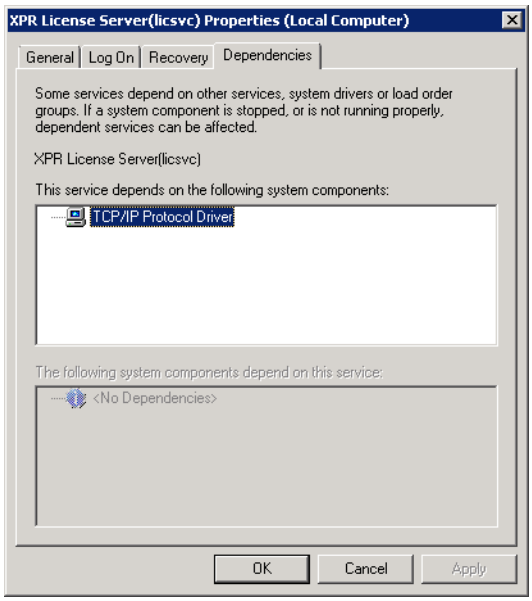
The dependencies between the XPR services created by the XPR setup must be deleted by the following steps:

1. Open the service management under **start > Programs > Administrative Tools > Services**.

   a) Rightclick an XPR service and select **Properties**.

   b) Click on the **Dependencies** tab.

   The first field displays the services the selected service depends on.



2. Click on **Cancel >**.
3. Open a command prompt and enter the command as follows:

   ```
   sc config <service name> depend= /
   ```

   IMPORTANT: Please note that a blank must follow the equals sign.

   Example:

   ```
   sc config licsvc depend= /
   ```

   Example output of a successful performance:

   ```
   C:\Users\administrator.WITWEBOLTE>sc config licsvc depend= /
   [SC] ChangeServiceConfig SUCCESS
   C:\Users\administrator.WITWEBOLTE>
   ```

   IMPORTANT: Be sure **not** to enter a command according to the following pattern:
   `sc config <service name> depend= \`
   The consequence of this wrong command would be that the resource to be created for this service could not be brought online (see step 21 on page 168). Even in case of this wrong command the described message of successful execution is issued.

4. You can check the dependencies of this service by repeating step 1 on page 144. No services are displayed on the **Dependencies** tab.

5. Execute step 3 for all XPR services displayed in the service management. The sequence of this execution is irrelevant. You find the names of these services in the **Service name** column of Table 12 on page 154.
6. Close the command prompt.

5.6 Configuring local Shares as Resource

5.6.1 Setting the Privileges of the XPR Server Shares in the Cluster

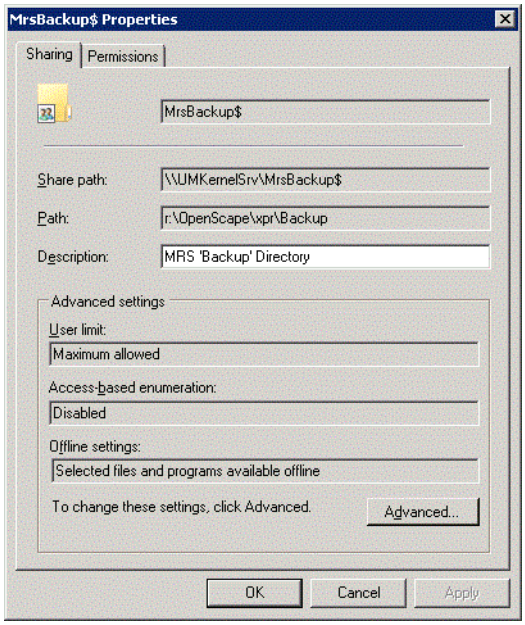
During the installation, several shares were configured for the XPR server. The privileges of the MrsBackup$ share are set in the following steps. Repeat these steps for each further XPR share according to the following table:

XPR Directory	Share name	Path	User group	Privileges
Backup	MrsBackup$	[LW:]\path\backup	Local Administrators	Full control
Client	MrsClnt	[LW:]\path\client	Everyone	Read
Folders	MrsFolders$	[LW:]\path\folders	Local Administrators	Full control
Monitor	MrsMonitor	[LW:]\path\monitor	Local Administrators	Read
NCO	MrsNCOConfig$	[LW:]\path\NCO	Local Administrators	Full control
Userdata	MrsUserdata$	[LW:]\path\userdata	Local Administrators	Full control

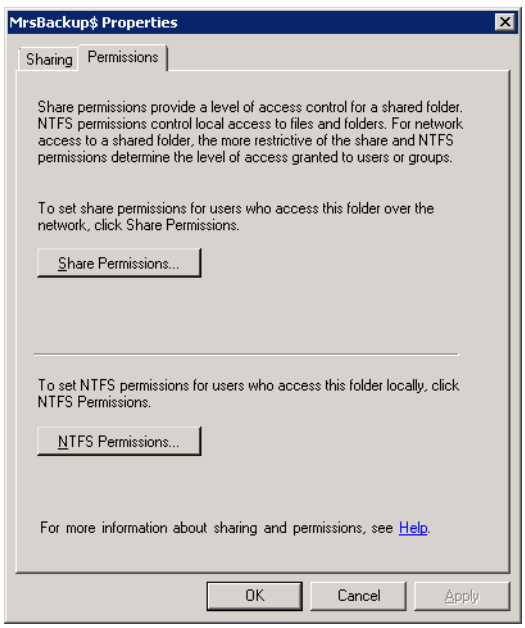
Table 11 Setting the Share Resource Privileges of the XPR Server on Windows Server 2008/2012

1. Open **Start > Programs > Administrative Tools > Failover Computer Management**.
2. Rightclick the **MrsBackup$** entry in the Shared Folders section.

3. Select **Properties...**.

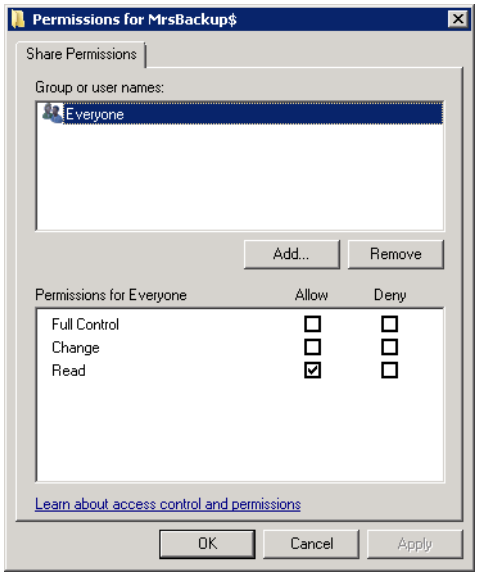


4. Click on the **Permissions...** tab.



5. Click on the **Share Permissions...** button.

6. The **Permissions for <share name>** dialog opens.



   a) Select user or group names probably already available in the **Group or user names** list.

   b) Click on the **Remove** button to delete the already available user names.

   c) Click on the **Add** button to add a new or existing user to the list. The user for the shares is specified by the network administrator.

   d) Create the user as member of the group specified by Table 11 on page 147.

   e) Assign the privileges to the user according to Table 11 on page 147.

7. Click on **OK**.

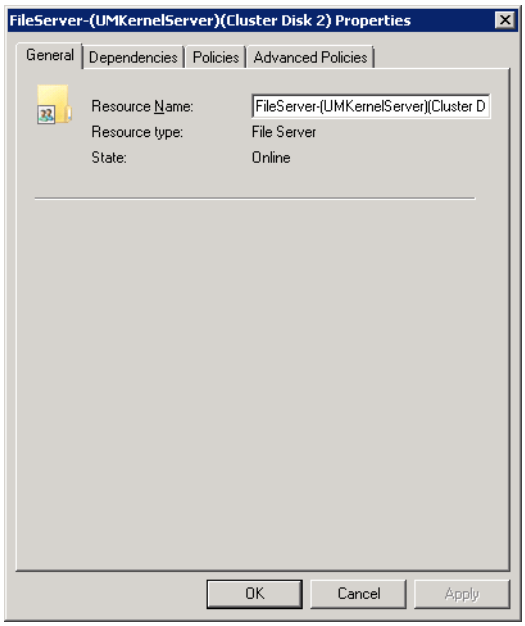
8. Click on **OK** to return to the Failover Cluster Management.

9. Repeat steps 2 on page 147 to 8 on page 149 for each further share according to Table 11 on page 147.

5.6.2 Configuring the Resource File Server Res

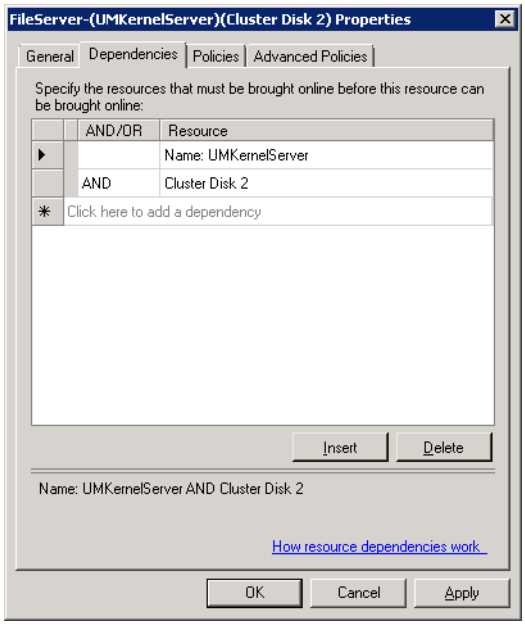
The middle section of the Failover Cluster Management displays the resource created by the XPR setup named **FileServer-(UMKernelServer)(Cluster Disk 2)** of type **File Server**. This resource represents the totality of all created shares, which are displayed in detail in the Failover Cluster Management further down below under **Shared Folders**. This resource must be configured via the following steps.

1. Rightclick the resource **FileServer-(UMKernelServer)(Cluster Disk 2)** and select **Properties**.



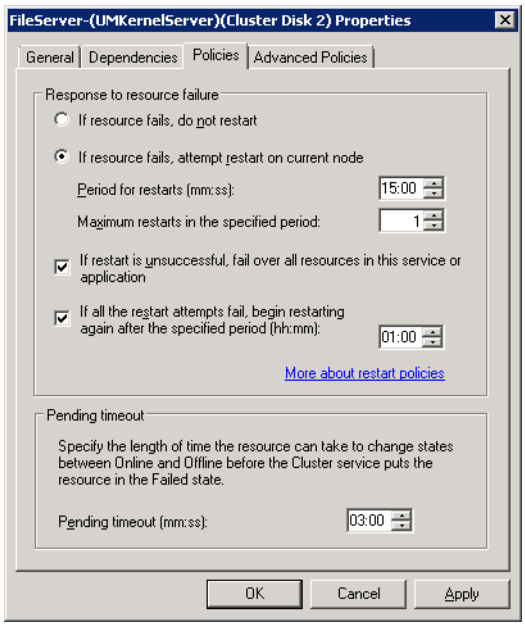
2. Change the name according to your requirements, for example `File Server Res`.

3. Click on the **Dependencies** tab.



4. Verify that this resource depends on the resource of type Network Name and on the Cluster Disk 2.

5. Click on the **Policies** tab.



6. Perform the settings according to the description in Section 2.1.9, “Failover and Failback”, on page 22.

7. Click on **OK**.

5.7 Configuring XPR Services as Resources

5.7.1 Overview

All XPR services that were configured in the cluster as services during the XPR server setup (see Chapter 4, “XPR Installation on a Cluster System”) were configured as local services on the first node.

You have determined the XPR services to be installed as local services on the first node by selecting the features to be installed in Section 4.4.1, “Selecting Features”, on page 89 (see also Table 4-2 on page 96). All other required XPR services must be installed on a satellite (see Section 5.10, “Satellite Environment with clustered Kernel Computer”, on page 188).

The services installed as local services on the first node must be configured as resources for operating as services in the cluster, thus being automatically transmitted to the second node in case of a failover. XPR services to operate on a satellite are not configured as resources.

All XPR services in the below Table 12 on page 154 can principally be installed in the cluster. The **Installation in the cluster** column indicates whether an XPR service has to be (value: Mandatory) or can be (value: Optional) installed in the cluster. Only for XPR services listed in this table you were allowed to select the corresponding features listed in Table 4-2 on page 96 during the installation.

The instructions listed in Section 5.7.2, “Procedure”, on page 159 in step 1 on page 159 to step 21 on page 168 exemplify the configuration of the license service (licsvc) as resource. Subsequently, you need to perform the same procedure for every further mandatory service, except for XPR Information Store, with the corresponding values according to Table 12 on page 154 in the specified order (see step 22 on page 169. The analog process for the XPR Information Store is described in Section 5.7.3, “Creating the Resource XPR Information Store Res”, on page 171.

After you have configured the mandatory XPR services as resources you need to configure the optional XPR services as resource (see step 23 on page 169), provided they have been installed on your XPR server. The sequence in which you configure the optional XPR services as resources is irrelevant. Therefore they all have the same consecutive number in the table. Please use the service management to learn which of these XPR services are available on your XPR server.

IMPORTANT: The **Availability** column in Table 12 on page 154 indicates whether a service in a cluster is generally available (GA) or only limited (LA).

Limited availability means that this XPR service depends on third-party software or contains such software, which has not been released by the producer for

Windows cluster. We have, however, verified that the corresponding XPR component can operate on a Windows cluster. If a change or bug in the third-party software leads to an XPR incompatibility in a Windows cluster, Unify Software and Solutions GmbH & Co. KG will attempt to provide a workaround. If such a workaround is not economically justifiable, this problem may be finally solved by performing the XPR cluster installation once more and in a way that this component is moved to a (not clustered) satellite.

IMPORTANT: The XPR Reporting APL (RepApl) and the XPR Schedule APL (RepScheduleApl) should be installed on satellite(s). In case of setting up the XPR Reporting APL or the XPR Reporting Schedule APL on a satellite, the XPR must be connected to a Microsoft SQL server found on a computer outside the cluster. Please heed the notes in Section A.1, “Using a Microsoft SQL Server”, on page 303.

Sequence	Service name in the service management	Service name	Installation in the cluster	[1]Availability	Dependencies	HKLM registry keys to be entered in the registry replication dialog	Feature selection during the XPR installation
1	XPR License Service (licsvc)	licsvc	Mandatory	GA	File Server Res (see Section 5.6.2, “Configuring the Resource File Server Res”, on page 150)	Use on 64-bit operating systems `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\...` instead of `HKEY_LOCAL_MACHINE\SOFTWARE\...` • SOFTWARE\PP-COM • SOFTWARE\SIEMENS • SYSTEM\CurrentControlSet\Services\licsvc If you use the system networking (ISC) in the cluster, the following keys must be entered as well: • HKLM\SOFTWARE\Wow6432Node\classes\CLSID\{C49A8D40-9047-49c4-88DD-637833875D7D} • HKLM\SOFTWARE\Wow6432Node\classes\CLSID\{93219EF7-2D4C-4d65-9A4A-8D1AC0F6790A}	
2	XPR Name Locator (nameloc)	NameLoc	Mandatory	GA	licsvc	SYSTEM\CurrentControlSet\Services\nameloc	
3	XPR Configuration Service (cfgsvc)	cfgsvc	Mandatory	GA	NameLoc	SYSTEM\CurrentControlSet\Services\cfgsvc	
4	XPR Status Dispatcher (xmrsvc)	xmrsvc	Mandatory	GA	cfgsvc	SYSTEM\CurrentControlSet\Services\xmrsvc	

Table 12 Services to be installed as Resources on Windows Server 2008/2012

Sequence	Service name in the service management	Service name	Installation in the cluster	[1]Availability	Dependencies	HKLM registry keys to be entered in the registry replication dialog	Feature selection during the XPR installation
5	XPR Information Store (infostor) **IMPORTANT**: The XPR Information Store is **not** configured as resource like the other services! **Do not** follow the instructions given in Section 5.7.2, “Procedure”, on page 159 but those provided in Section 5.7.3, “Creating the Resource XPR Information Store Res”, on page 171!	Infostor	Mandatory	GA	xmrsvc Network name Drive on which the Infostor files are found		
6	XPR Message Router (mta)	mta	Mandatory	GA	Infostor	SYSTEM\CurrentControlSet\Services\mta	
7	XPR Administrator (mrs)	mrs	Mandatory	GA	mta	SYSTEM\CurrentControlSet\Services\mrs	
8	XPR TCP/IP Transport Layer(tcpApl)	tcpapl	Mandatory	GA	mrs	SYSTEM\CurrentControlSet\Services\TcpApl	TCP/IP support
9	stunnel	stunnel	Mandatory	GA	tcpapl	SYSTEM\CurrentControlSet\Services\stunnel	See step 6 on page 113
10	XPR Directory Service (DirSvc)	DirSvc	Mandatory	GA	mrs	SYSTEM\CurrentControlSet\Services\DirSvc	
11	XPR Internet Mail APL (SmtpApl)	SMTPAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\SmtpApl	Internet e-mail server
11	XPR Vm2Txt APL(Vm2TxtApl)	Vm2TxtApl	Optional	LA	Network with internet access	SYSTEM\CurrentControlSet\Services\Vm2TxtAp	“Speech to Text”
11	XPR Web APL (WebApl)	WEBAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\WebApl	Webserver
11	XPR Mail APL (MailApl)	MailApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\MailApl	
11	XPR Lear APL (Lear)	Lear	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\Lear	’Lear’ test module
11	XPR Notification APL (NotApl)	NotApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\NotApl	Notification module

Table 12 Services to be installed as Resources on Windows Server 2008/2012

Sequence	Service name in the service management	Service name	Installation in the cluster	[1]Availability	Dependencies	HKLM registry keys to be entered in the registry replication dialog	Feature selection during the XPR installation
11	XPR Lpr APL (LprApl)	LprApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\LprApl	Print output management
11	XPR Csta Apl (CstaApl)	CSTAAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\CstaApl	CSTA protocol
11	XPR Cti APL(CtiApl) Note: With CSTA connection	CTIAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\CtiApl	CTI Computer Telephony Integration
11	XPR ip APL (ipApl) Note: Without TTS and without ASR	IPAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\ipApl	IP telephony
11	XPR Ldap APL (LdapApl)	LDAPAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\LdapApl	LDAP directory synchronization
11	XPR Presence APL (PresenceApl)	PRESENCE APL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\PresenceApl	Presence APL
11	XPR Xml APL (XmlApl)	XmlApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\XmlApl	Web Service Provider
11	XPR VM APL (VMApl)	VMApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\VMApl	Virtual Machine (VM)
11	XPR Printer APL (PrintApl)	PrintAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\PrintApl	Print module
11	XPR Cti APL(CtiApl) Note: With TAPI connection	CTIAPL	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\CtiApl	CTI Computer Telephony Integration
11	XPR Isdn APL (IsdnApl) Note: Without TTS and without ASR	IsdnApl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\IsdnApl	ISDN hardware
11	XPR SMS Large Account APL (SmsIPApl)	SmsIPApl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\SmsIPApl	Short Message Service
11	XPR Serial APL (V24Apl)	V24Apl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\V24Apl	V.24 support
11	XPR FileInterface APL (FiApl)	File interface	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\FiApl	File interface

Table 12 Services to be installed as Resources on Windows Server 2008/2012

Sequence	Service name in the service management	Service name	Installation in the cluster	[1]Availability	Dependencies	HKLM registry keys to be entered in the registry replication dialog	Feature selection during the XPR installation
11	XPR Exchange Connector for i386 (<XPR server name>:<Exchange 2003 server name>)	<XPR server name>:<Exchange 2003 server name>	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\ExchApl	MS Exchange 2003 Connector
11	XPR Exchange Connector for i386 (<XPR server name>:<Exchange 2007 server name>)	<XPR server name>:<Exchange 2007 server name>	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\ExchApl	MS Exchange 2007 Connector
11	XPR Exchange UM APL	ExUmApl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\ExUmApl	MS Exchange TUM Connector
11	XPR Lotus Notes APL (LNApl)	LNAPL	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\LnApl	Lotus Notes Gateway
11	XPR Lotus Notes UM APL (LnUmApl)	LnUmAPL	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\LnUmApl	Lotus Notes TUM
11	XPR SAP R/3 APL (SapR3Apl)	SapR3Apl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\SapR3Apl	SAPconnect
	IMPORTANT: Setting up this APL on a Windows cluster **has been released only project-specifically**.						
11	XPR SAPphone APL(SAPphoneApl)	SAPphoneApl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\SAPphoneApl	SAPphone (CTI)
	IMPORTANT: Setting up this APL on a Windows cluster **has been released only project-specifically**.						
11	XPR Connection Apl (ConApl)	CONAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\ConApl	Connection Apl

Table 12 Services to be installed as Resources on Windows Server 2008/2012

1 GA: General Availability), LA: Limited Availability

You cannot install the following XPR services on a Windows cluster:

Service name in the service management	Service name	Feature selection during the installation
XPR Connection APL (conapl) with web conferencing, voice conferencing	CONAPL	Connection APL
XPR Isdn APL (IsdnApl) Note: With TTS and/or ASR	IsdnApl	ISDN hardware
XPR ip APL (ipApl) Note: With TTS and/or ASR	IPAPL	IP telephony
XPR Db APL (DbApl)	DBAPL	Database connection module
XPRSAP Business Routing APL (SAPROUTEAPL)	SAPROUTEAPL	SapConnect: routing
XPR HiPath Management APL (HpmApl)	HPMAPL	User administration with HPM-UM
XPR ABC APL (AbcApl)	ABCAPL	Alcatel 4400 ABCA protocol
XPR Wall Display APL (WallApl)	WALLAPL	Wall display module

Table 13 XPR Services that cannot be installed on a Cluster on Windows 2008/2012

5.7.2 Procedure

How to configure a service as XPR resource:

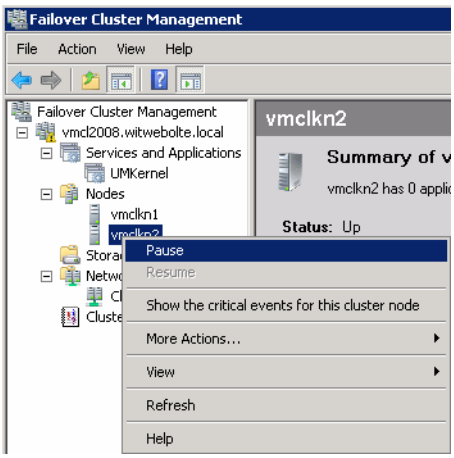
IMPORTANT: Verify that in the service management the corresponding user name is contained in the **Log On As** column, all relevant XPR services are stopped and the **Startup Type** is set to Manual.

Creating the resource

1. We recommend to set the second node to **Pause** by the following substeps to prevent a possible failover.

   a) Open the Failover Cluster Management under **start > Programs > Administrative Tools > Failover Cluster Management**.

   b) Rightclick **Nodes** > **<name of the second node>** in the left-hand section.



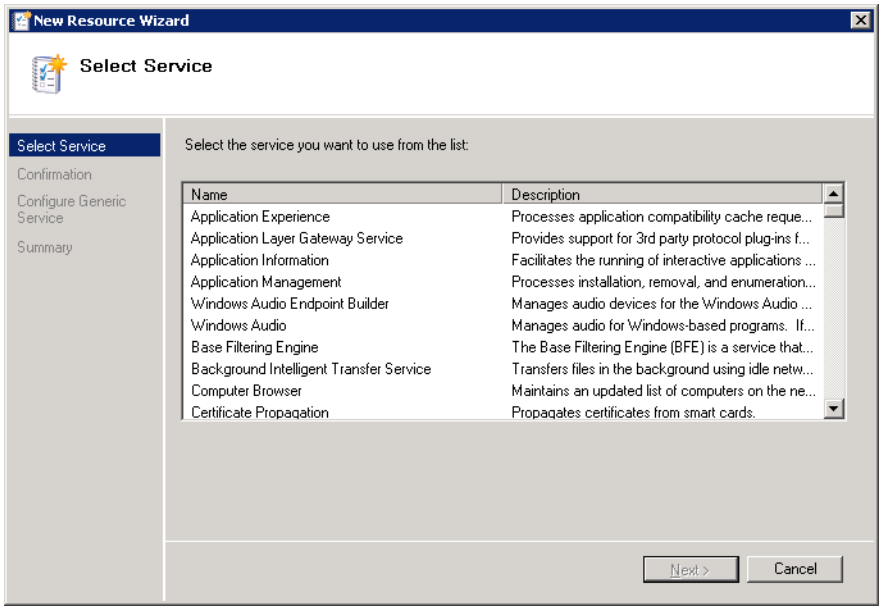
   c) Select the **Pause** option.

2. Verify that the application for the XPR server is online.

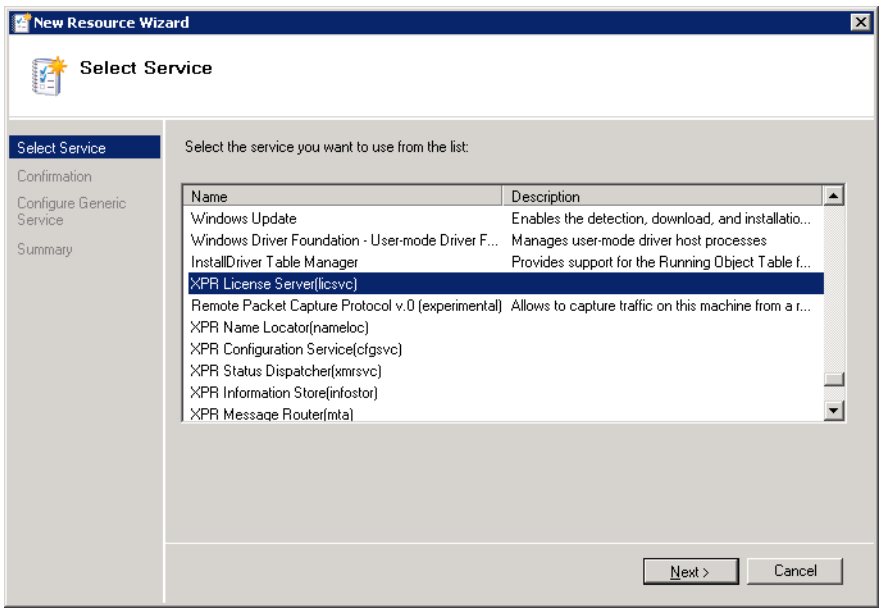
3. In the Failover Cluster Management, rightclick the folder of the application for the XPR server.

4. Select **Add a resource > 4 - Generic Service** in the context menu

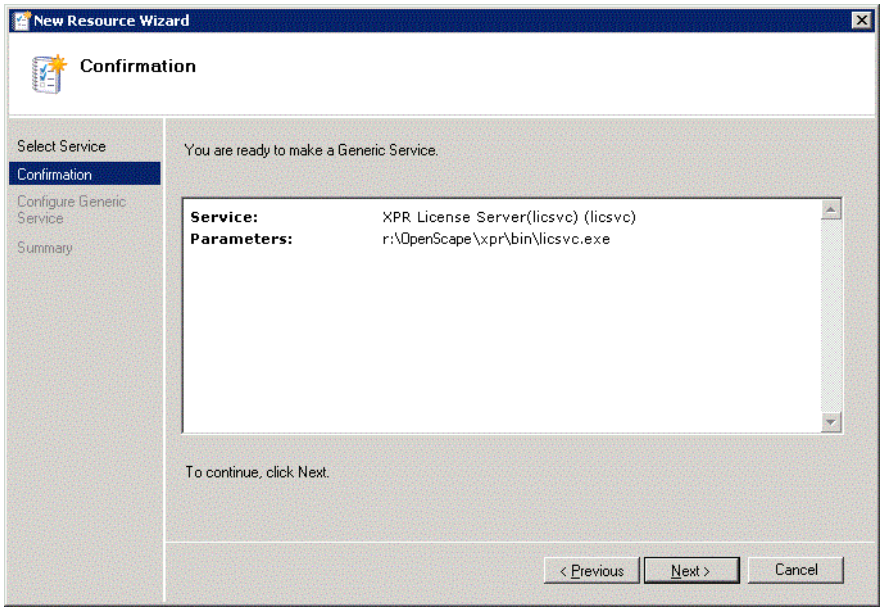
   The **New Resource Wizard** dialog opens.



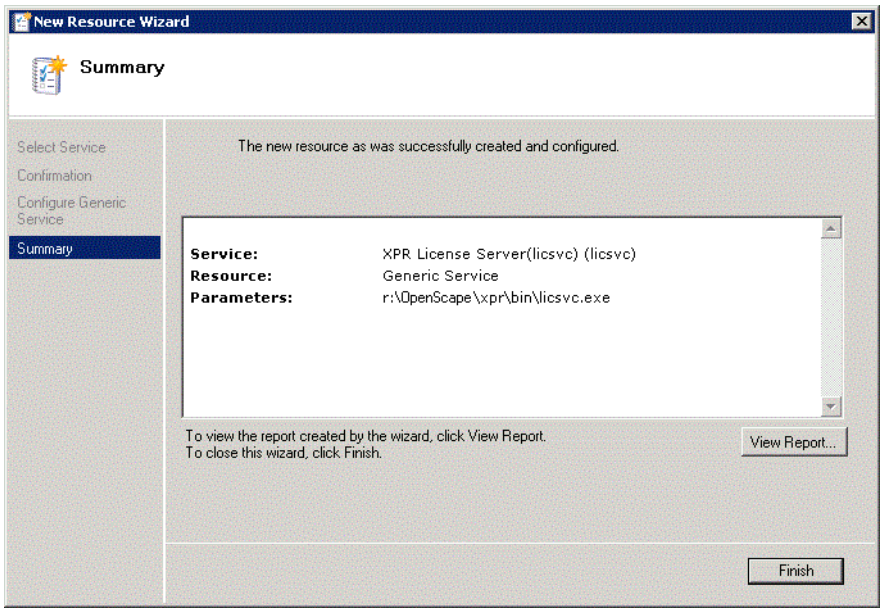
5. Select the entry **XPR License Server(licsvc)**.



6. Click on **Next**.

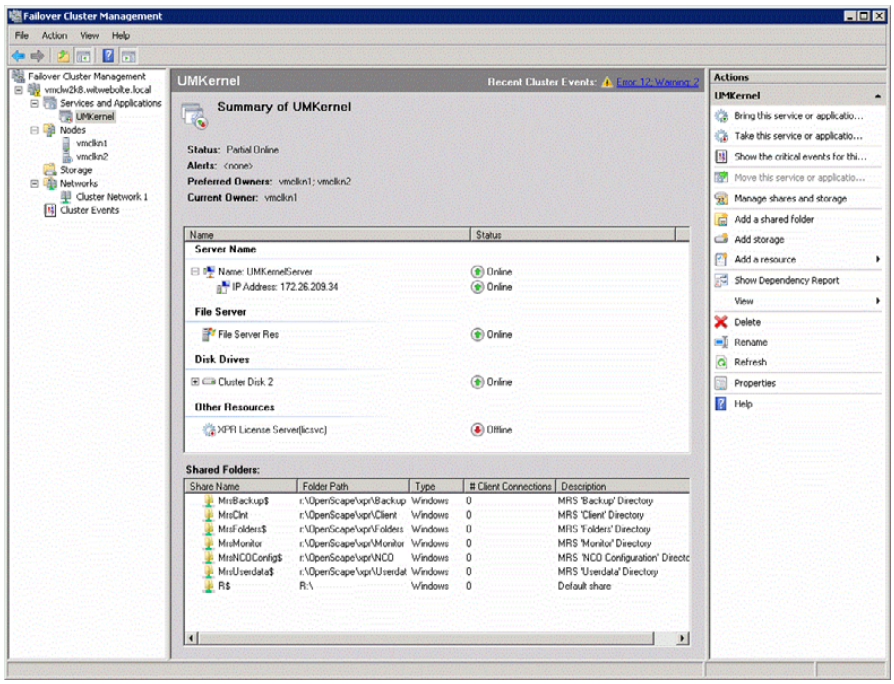


7. Click on **Next**.



8. Click on **Finish**.

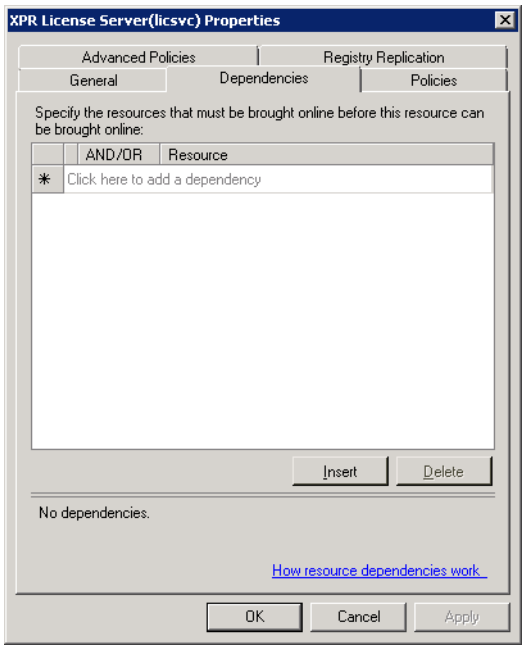
   The service resource has now been created. It appears as new entry under the category **Other Resources** in the Failover Cluster Management. Since the new resource is offline, the status of the application has changed from online to partly online.



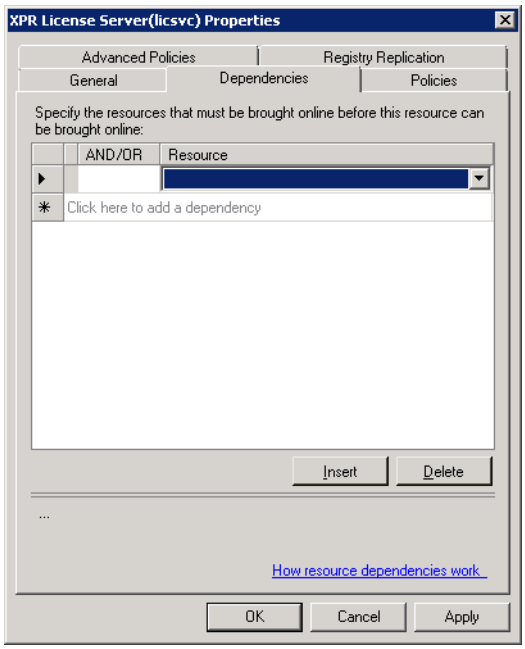
   The new resource must now be configured.

Configuring the resource

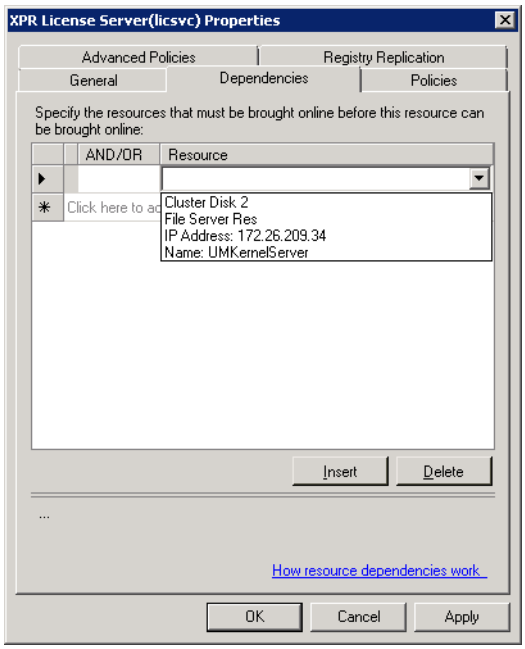
9. Rightclick this entry and select **Properties**.
10. Click on the **Dependencies** tab.



a) Click on the **Insert >** button.



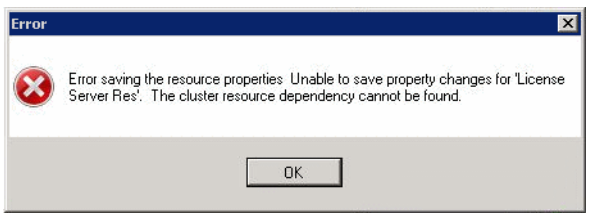
b) Click on the triangle to the right of the newly created field.



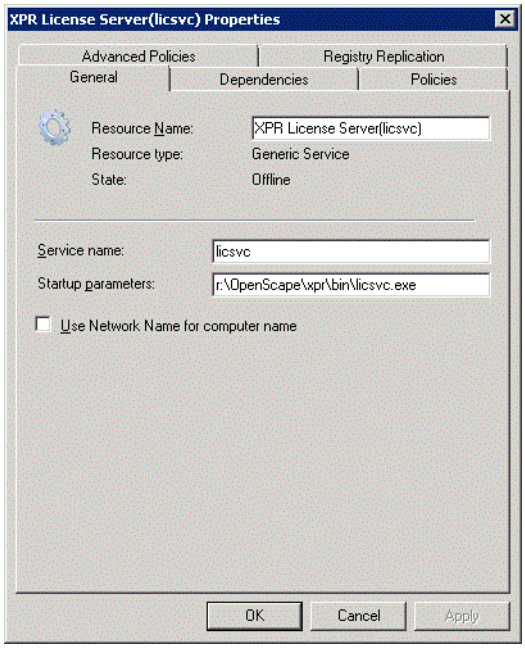
c) Select the resources mentioned in the **Dependencies** column of Table 12 on page 154 for the resource to be configured. Select the **File Server Res** resource, since all network shares are combined in this resource.

11. Click on **Apply**.

NOTE: Execute step 10 and step 11 before step 12d on page 165 as described. Otherwise, you receive an error message when executing step 21 on page 168.



12. Click on the **General** tab.



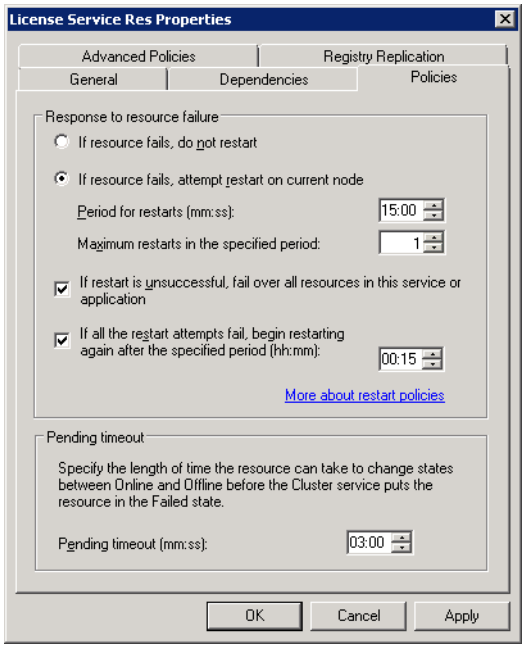
a) Change the value of field **Resource Name** according to your requirements, for example in `License Service Res`.

b) Verify that the name of the new service has been entered in the **Service Name** field. This is `licsvc` for the License Service. You find the values for all further services in Table 12 on page 154 in the **Service name** column.

c) Leave the default in field **Startup Parameters**.

d) Activate the option **Use Network Name for computer name**.

13. Click on the **Policies** tab.



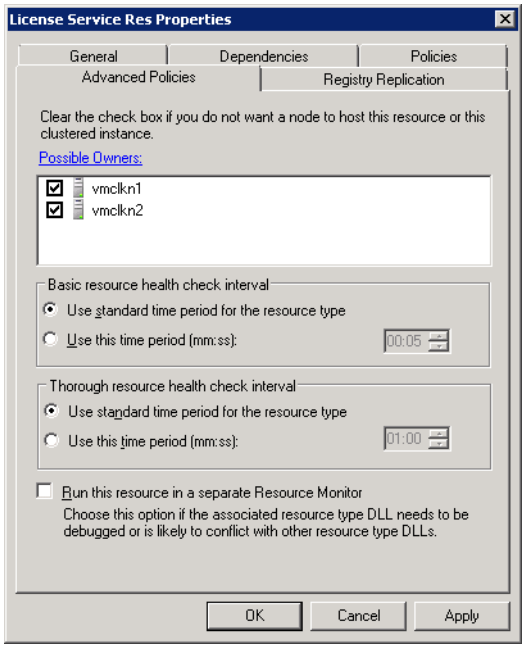
Perform the settings according to the description in Section 2.1.9, “Failover and Failback”, on page 22.

NOTE: The kernel resources are not necessarily identical with the mandatory resources in Table 12 on page 154.

---

14. Activate the **If resource fails, attempt restart on current node** radio button.
15. Enter in the **Period for restarts (mm:ss)** and **Maximum restarts in the specified period** fields values according to the requirements of the operator of the cluster installation.
16. If the service that you configure as resource is a kernel resource, activate the **If restart is unsuccessful, fail over all resources in this service or application** checkbox.
17. If the service that you configure as resource is not a kernel resource, deactivate the **If restart is unsuccessful, fail over all resources in this service or application** checkbox.

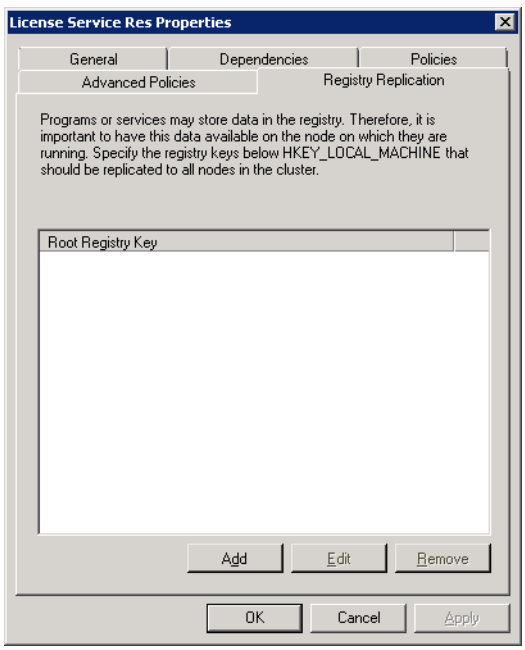
18. Click on the **Advanced Policies** tab.



a) Verify that the checkboxes for all cluster nodes are active in the topmost field.

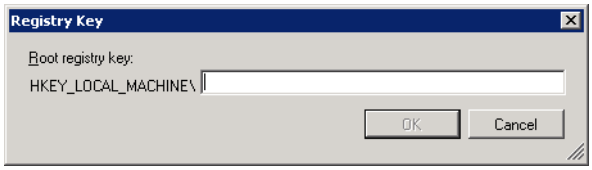
b) Verify that the **Run this resource in a separate Resource Monitor** is inactive.

19. Click on the **Registry Replication** tab.



a) Click the **Add...** button.

The **Registry Key** entry dialog opens.



b) In the **Root registry key** field enter for the service for which you configure the resource one of the values that are present for this service in the **HKLM registry keys to be entered in the Registry Replication dialog** column of Table 12 on page 154.

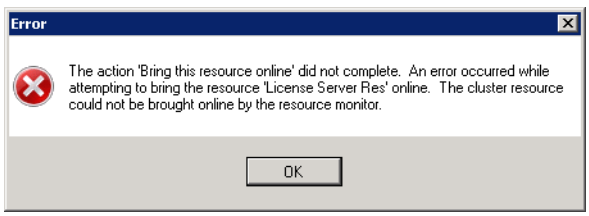
c) Click on **OK**.

d) Repeat substeps 19a on page 168 to 19c on page 168 for each value present for this service in the **HKLM registry keys to be entered in the Registry Replication dialog** column of Table 12 on page 154.

20. Click on the **OK** button to complete the configuration of the service as resource and to return to the Failover Cluster Management.

21. In the middle section of the Failover Cluster Management select the just created resource with the right mouse button and select **Bring this resource online**.

    If the attempt to bring the resource online fails, you can execute one or both of the following substeps to solve the problem. This depends on whether the resource's state is **Offline** or **Failed** after the attempt or whether the following error message appears:



a) Repeat step 3 from Section 5.5.3, “Removing Xpressions Service Dependencies”, on page 144 for this resource.

b) Repeat step 2 from Section 5.3, “Reassignment of the Computer Name in the Registry”, on page 129 for this resource.

NOTE: The Eventlog may deliver further notes for bug fixing. The meaning of an error code is delivered by the `net helpmsg <error code>` command. The `net helpmsg 1075` command delivers for example the following output:

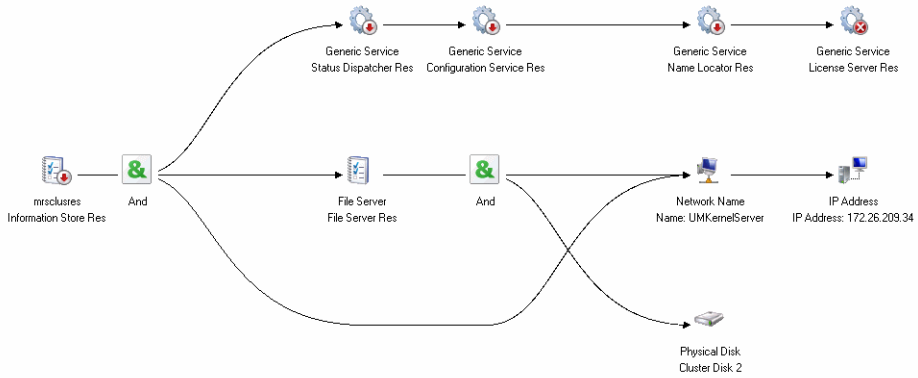
```
The dependency service does not exist or has been marked
for deletion.
```

Bring the resource online.

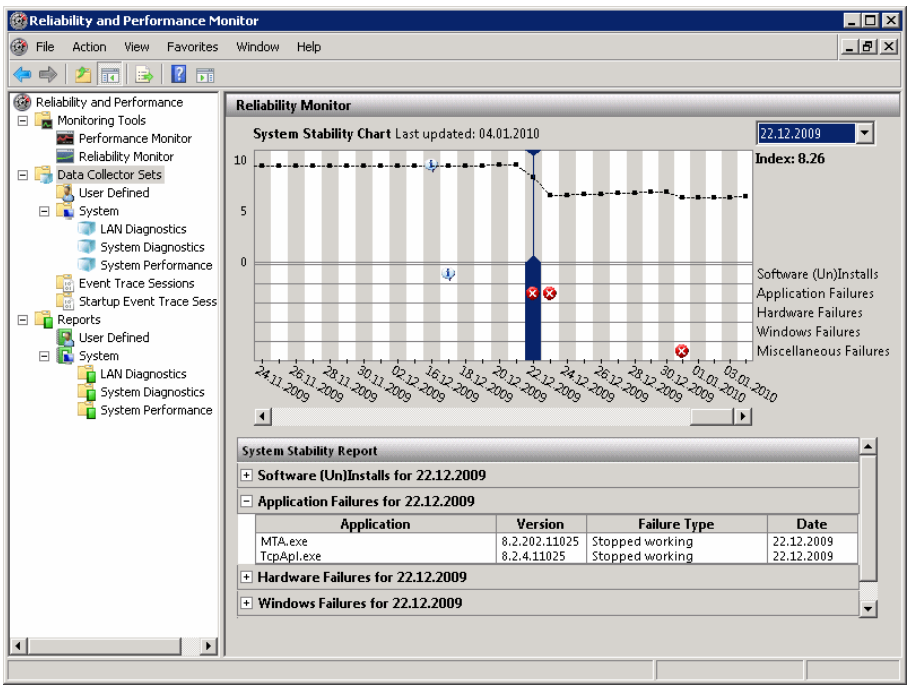
22. Repeat step 1 on page 159 to step 21 on page 168 for each further mandatory service except for XPR Information Store in the sequence given in Table 12 on page 154. Use the values according to Table 12 on page 154. The analog process for the XPR Information Store is described in Section 5.7.3, “Creating the Resource XPR Information Store Res”, on page 171.

23. Repeat step 1 on page 159 to step 21 on page 168 for each further optional service in Table 12 on page 154. Use the values according to Table 12 on page 154. The sequence in which you configure the optional XPR services as resources is irrelevant. Therefore they all have the same consecutive number in Table 12 on page 154. Please use the service management to learn which of these XPR services are available on your XPR server.

A resource's dependency on other resources is shown in a tree structure when you click it with the right mousebutton and select **Show Dependency Report**.



You can obtain further information about the system from the Reliability and Performance Monitor. To start this monitor, select **start** > **Run** and enter the command `performance` in the **Open** field.

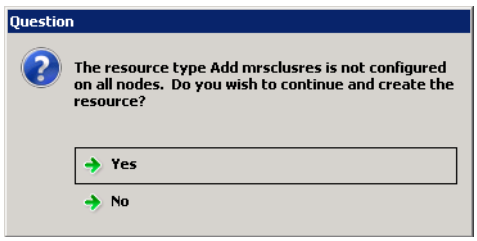


5.7.3 Creating the Resource XPR Information Store Res

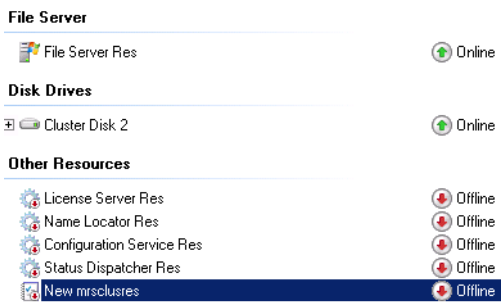
1. In the Failover Cluster Management, rightclick the folder of the application for the XPR server on the first node.
2. Verify that the application for the XPR server has status **Online** or **Partial Online**.
3. Select **Add a resource > More resources > 8 - Add mrsclusres** in the context menu.

IMPORTANT: Very important! Create only a single resource of type **mrsClusRes**. If another resource of this type is created, the Failover Cluster Management cannot be operated anymore.

If you see the following error message, click on **No**, copy the `mrsclusres.dll` file to **all** nodes and select **Add a resource > More resources > 8 - Add mrsclusres** once more.

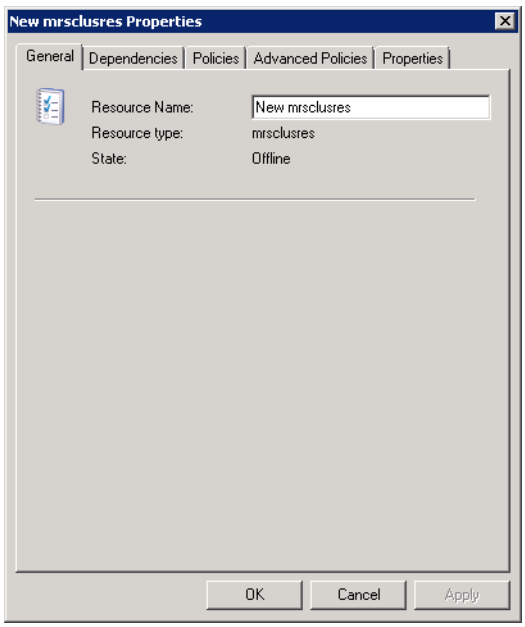


4. An entry **New mrsclusres** is created in the Failover Cluster Management under the **Other Resources** category.



Configuring the resource

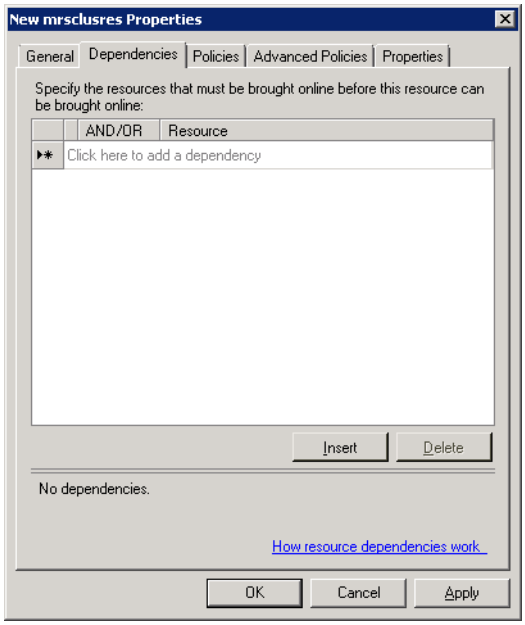
5. Double-click this entry.



NOTE: In case of a resource of type **mrsClusRes**, no parameters and no values are entered for the registry replication.

6. Change the value of field **Resource Name** according to your requirements, for example in `Information Store Res`.

7. Click on the **Dependencies** tab.



a) Click on the **Insert >** button.

b) Click on the triangle to the right of the newly created field.

c) Select **Cluster Disk 2**.

d) Click on the **Insert >** button.

e) Click on the triangle to the right of the newly created field.

f) Select **File Server Res**.

g) Click on the **Insert >** button.

h) Click on the triangle to the right of the newly created field.

i) Select the **Status Dispatcher Res**.

j) Click on the **Insert >** button.

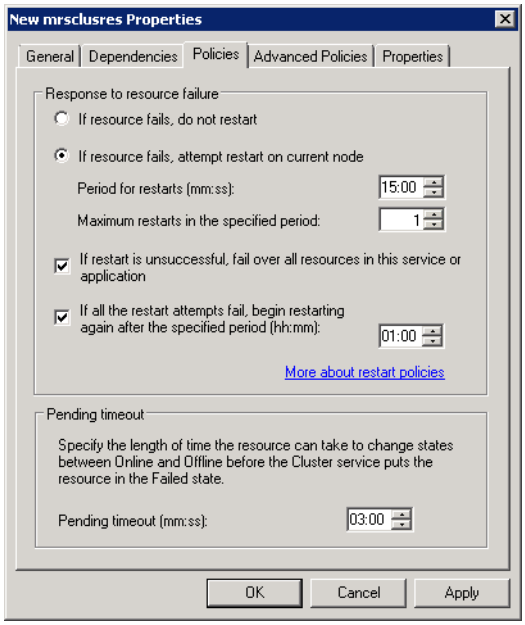
k) Click on the triangle to the right of the newly created field.

l) Select the **Name: UMKernelServer**.

NOTE: It is not sufficient to enter the dependencies of the resource XPR Information Store Res on **File Server Res** and **Status Dispatcher Res**, though XPR Information Store Res depends on **Cluster Disk 2** via **File Server Res** and on **Name: UMKernalServer** via **File Server Res** and via **Status Dispatcher Res** indirectly.

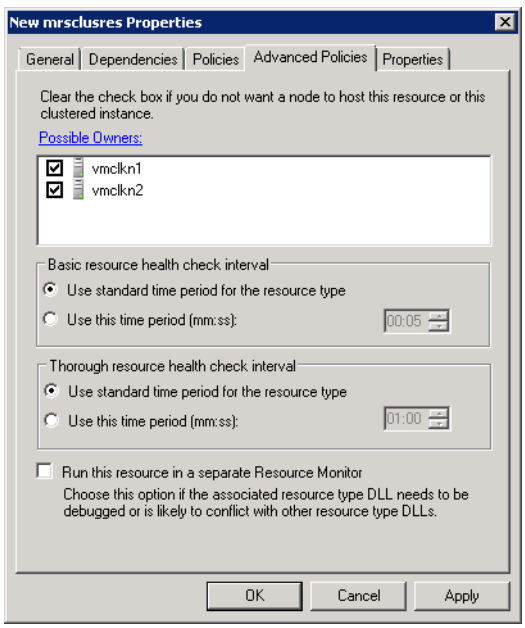
---

8. Click on the **Policies** tab.



9. Set the time for **if all the restart attempts fail, begin restarting again after the specified period (hh:mm)** to 00:15.

10. Click on the **Advanced Policies** tab.

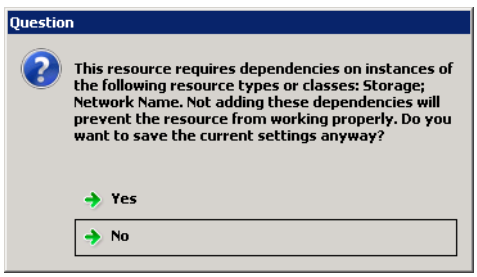


a) Verify that the checkboxes for all cluster nodes are active in the topmost field.

b) Verify that the **Run this resource in a separate Resource Monitor** is inactive.

11. Click on the **OK** button to complete the configuration of the service as resource and to return to the Failover Cluster Management.

12. The following error message appears when no dependency has been entered or some are missing:



    a) Click on **No**.

    b) Execute step 7 on page 173. Be sure to make XPR Information Store Res dependent on all resources mentioned there.

    c) Click on **OK**.

13. In the middle section of the Failover Cluster Management select the just created resource with the right mouse button and select **Bring this resource online**.

    If the attempt to bring the resource online fails, you can execute one or both of the following substeps to solve the problem. This depends on whether the resource's state is **Offline** or **Failed** after the attempt or an error message appears:

    a) Repeat step 3 from Section 5.5.3, “Removing Xpressions Service Dependencies”, on page 144 for this resource.

    b) Repeat step 2 from Section 5.3, “Reassignment of the Computer Name in the Registry”, on page 129 for this resource.

NOTE: The Eventlog may deliver further notes for bug fixing. The meaning of an error code is delivered by the `net helpmsg <error code>` command. The `net helpmsg 1075` command delivers for example the following output:

```
The dependency service does not exist or has been marked
for deletion.
```

Bring the resource online.

NOTE: When creating and configuring a resource of type **mrsClusRes**, no values are entered for the registry replication.

5.7.4 Time Zone Setting with Resources brought Offline

If you do not want to activate/deactivate the time zone support, skip this section.

If you have already followed the instructions in Section 4.4.13, “Setting Time Zones with stopped Services”, on page 120, skip this section.

The file `<XPR_Install>\bin\TimeZoneSupport.exe` controls the use of time zones in the XPR server. It has the effect that time stamps are adjusted in the database. You can obtain details of the time zone support from the administrator documentation *OpenScape Xpressions Server Administration*.

Execute this file only if you want to activate/deactivate the time zone support and no more and no fewer of the following resources of the XPR service resources are online:

- XPR License Service Res
- XPR Name Locator Res
- XPR Configuration Service Res
- XPR Status Dispatcher Res
- XPR Information Store Res

How to reach this state:

1. Bring all services offline.

   a) In the Failover Cluster Management, rightclick the folder of the application for the XPR server.

   b) Select **Take this resource offline** from the context menu.

   After some time all XPR service resources are displayed as offline.

2. Rightclick the resource XPR *Information Store Res* and select **Bring this resource online**.

   All resources in the above list are brought online.

3. Open a command prompt.
4. Navigate to the `<XPR_Install>\bin\` directory.
5. If you want to activate the time zone support, enter the following command:

   ```
   TimeZoneSupport.exe on
   ```

6. If you want to deactivate the time zone support, enter the following command:

   ```
   TimeZoneSupport.exe off
   ```

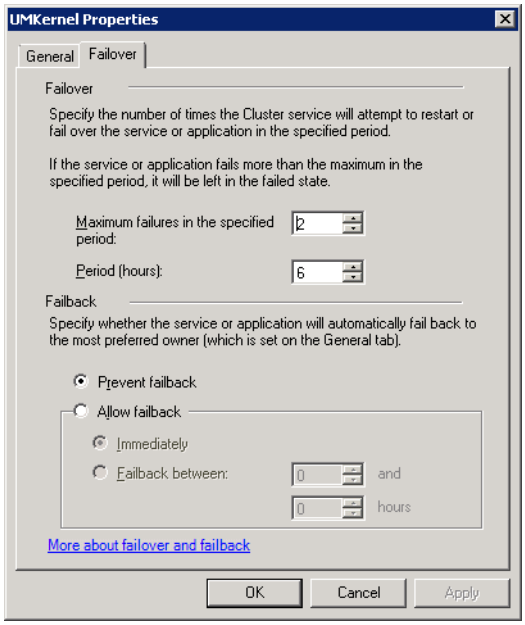
7. Bring all XPR service resources you have taken offline in step 1 on page 176 online again by rightclicking these resources in the Failover Cluster Management and selecting **Bring this resource online**.

NOTE: You need to execute the file `<XPR_Install>\bin\TimeZone-Support.exe` on one cluster node only. It need not be executed again on another node. The changes it causes in the database are replicated to another node in the course of a replication. It is irrelevant on which node this file is executed.

5.7.5 Settings of the Application for Failover

Perform the following steps for all resources:

1. In the left-hand section of the Failover Cluster Management, rightclick the application for the XPR and select the **Properties** menu option.
2. Click on the **Failover** tab.



The **Maximum failures in the specified period** field value indicates the maximum number of failovers performed within the time specified in the **Period** field, thus how often the entire application is shifted to the other node. If, for example, the **Maximum failures in the specified period** field has value `10` and the **Period** field value `6`, a maximum of 10 failovers is performed within 6 hours.

Enter suitable values in the **Maximum failures in the specified period** and **Period** fields. These may vary from case to case. We recommend to set the **Maximum failures in the specified period** field to value `1` and the **Period** field to value 8.

NOTE: These settings, as they are described in step 13 on page 166 to step 17 on page 166 and in step 8 on page 174 to step 13 on page 175, apply for the application and not for a single resource.

---

3. Click on **OK**.

5.8 Replicating XPR Services as Resources to the second Node

The XPR services in the cluster must be replicated to each cluster node. This comprises the moving of the services, the installation of the services and the privilege assignment for the services.

The instructions given in Section 5.8.1, “Shifting the XPR Services as Resources on the second Node”, on page 179 and in Section 5.8.2, “Installation and Privilege Assignment of the XPR Services on the second Node”, on page 180 need to be performed for all further nodes of the cluster. For each of these nodes all the instructions of the two sections have to be followed before you can begin with the instructions for another node.

5.8.1 Shifting the XPR Services as Resources on the second Node

Execute the following steps on the first node:

1. Execute the following substeps if you have followed our recommendation in step 1 on page 159 to set the second node to **Pause**. This served for preventing a failover.

   a) Open the Failover Cluster Management under **start** > **Programs** > **Administrative Tools** > **Failover Cluster Management**.

   b) Rightclick **Nodes** > **<name of the second node>** in the left-hand section.

   c) Select the **Resume** option.

   d) Rightclick **Nodes** > **<name of the first node>** in the left-hand section.

   e) Set the first node to **Pause**.

2. Bring all services offline.

   a) In the Failover Cluster Management, rightclick the folder of the application for the XPR server.

   b) Select **Take this service or application offline** from the context menu.

3. Now shift the current application to the second node.

   a) In the Failover Cluster Management, rightclick the folder of the application for the XPR server.

   b) If you have installed the SmsIpApl, execute the following command for registering the AxMmCtl.dll on the second node: `regsvr32 c:\□□□□l install>□□pb□□□□□□x.a`Example: `regsvr32 c:\□□\b>s□□\\xpr\bin\AxMmCtl.dll.`

c) Select the menu option **Move this service or application to another node > 1 - Move to node <name of the second node>** from the context menu.

All resources of the current node are shut down. The cluster will then attempt to transfer these resources to the second node and reboot them there. The Failover Cluster Management indicates this by showing the name of the second node instead of the first node's name as value for **Current owner** in the middle section.

5.8.2 Installation and Privilege Assignment of the XPR Services on the second Node

The services of the application for the XPR server have been moved to the second node in the previous steps. However, they have not been installed there. Furthermore, no rights have been configured for these services on the second node.

1. Log in on the second node.
2. Open the Failover Cluster Management on the second node under **start > Programs > Administrative Tools > Failover Cluster Management**.

The following steps will describe the service installation and privilege assignment by way of the License Service (licsvc) example.

NOTE: **C++ 2008 Redistributable** must be installed on the nodes manually for granting a smooth operation of the license service.

The same process must then be performed for each further mandatory service in Table 14 in the given sequence much in the same manner (see step 13 on page 185).

IMPORTANT: This order of mandatory services must definitely be observed during the installation and privilege assignment, as each mandatory service in Table 12 on page 154 depends on the existence of the service that precedes it.

Thereafter, analog steps must be executed for the optional services in Table 12 on page 154 (see step 14 on page 185), provided, they have been installed on your XPR server. The sequence in which you configure and assign privileges to the optional XPR services as resources is irrelevant. Therefore they all have the same consecutive number in the table. Please use the service management to learn which of these XPR services are available on your XPR server.

The **Installation in the cluster** column indicates whether an XPR service has to be (value: Mandatory) or can be (value: Optional) installed in the cluster.

Only for XPR services listed in Table 12 on page 154 or Table 14 on page 181 you were allowed to select the corresponding features listed in Table 4 on page 90 during the XPR installation.

Sequence	Service name in the service management	Installation in the cluster	Installation command
1	XPR License Service (licsvc)	Mandatory	sc create licsvc binpath= ".\OpenScape\xprlicsvc\\licsvc.exe"
2	XPR Name Locator (nameloc)	Mandatory	sc create nameloc binpath= "<XPR_Install>\bin\ nameloc.exe"
3	XPR Configuration Service (cfgsvc)	Mandatory	sc create cfgsvc binpath= "<XPR_Install>\bin\ cfgsvc.exe"
4	XPR Status Dispatcher (xmrsvc)	Mandatory	sc create xmrsvc binpath= "<XPR_Install>\bin\ xmrsvc.exe"
5	XPR Information Store (infostor)	Mandatory	sc create infostor binpath= "<XPR_Install>\bin\ infostor.exe"
6	XPR Message Router (mta)	Mandatory	sc create mta binpath= "<XPR_Install>\bin\ mta.exe"
7	XPR Administrator (mrs)	Mandatory	sc create mrs binpath= "<XPR_Install>\bin\ mrs.exe"
8	XPR TCP/IP Transport Layer(tcpApl)	Mandatory	sc create tcpapl binpath= "<XPR_Install>\bin\ tcpapl.exe"
9	stunnel	Mandatory	sc create stunnel binpath= "<XPR_Install>\bin\stunnel\ stunnel.exe"
10	XPR Directory Service (DirSvc)	Mandatory	sc create dirsvc binpath= "<XPR_Install>\bin\ dirsvc.exe"
11	XPR Internet Mail APL (SmtpApl)	Optional	sc create smtpapl binpath= "<XPR_Install>\bin\ smtpapl.exe"
11	XPR Vm2Txt APL(VM2TXTAPL)	Optional	sc create smtpapl binpath= "<XPR_Install>\bin\vm2txtapl.exe"
11	XPR Web APL (WebApl)	Optional	sc create webapl binpath= "<XPR_Install>\bin\ webapl.exe"
11	XPR Mail APL (MailApl)	Optional	sc create mailapl binpath= "<XPR_Install>\bin\ mailapl.exe"
11	XPR Lear APL (Lear)	Optional	sc create lear binpath= "<XPR_Install>\bin\ lear.exe"
11	XPR Notification APL (NotApl)	Optional	sc c create notapl binpath= "<XPR_Install>\bin\ notapl.exe"
11	XPR Lpr APL (LprApl)	Optional	sc create lprapl binpath= "<XPR_Install>\bin\ lprapl.exe"
11	XPR Csta Apl (CstaApl)	Optional	sc create cstaapl binpath= "<XPR_Install>\bin\ cstaapl.exe"
11	XPR Cti APL(CtiApl) Note: With CSTA connection	Optional	sc create ctiapl binpath= "<XPR_Install>\bin\ ctiapl.exe"
11	XPR ip APL (ipApl) Note: Without TTS and without ASR	Optional	sc create ipapl binpath= "<XPR_Install>\bin\ ipapl.exe"
11	XPR Ldap APL (LdapApl)	Optional	sc create ldapapl binpath= "<XPR_Install>\bin\ ldapapl.exe"
11	XPR Presence APL (PresenceApl)	Optional	sc create presenceapl binpath= "<XPR_Install>\bin\ presenceapl.exe"
11	XPR Xml APL (XmlApl)	Optional	sc create xmlapl binpath= "<XPR_Install>\bin\ xmlapl.exe"
11	XPR VM APL (VMApl)	Optional	sc create vmapl binpath= "<XPR_Install>\bin\ vmapl.exe"
11	XPR Printer APL (PrintApl)	Optional	sc create printapl binpath= "<XPR_Install>\bin\ printapl.exe"
11	XPR Isdn APL (IsdnApl) Note: Without TTS and without ASR	Optional	sc create isdnapl binpath= "<XPR_Install>\bin\ isdnapl.exe"

Table 14 XPR Services to be installed on the second Node on Windows Server 2008/2012

Sequence	Service name in the service management	Installation in the cluster	Installation command
11	XPR SMS Large Account APL (SmsIPApl)	Optional	sc create smsipapl binpath= “XPR_Install>\bin\ smsipapl.exe”
11	XPR Serial APL (V24Apl)	Optional	sc create v24apl binpath= “<XPR_Install>\bin\ v24apl.exe”
11	XPR FileInterface APL (FiApl)	Optional	sc create fiapl binpath= “<XPR_Install>\bin\ fiapl.exe”
11	XPR Exchange Connector for i386 (<XPR server name>:<Exchange 2003 server name>)	Optional	sc create <XPR server name>:<Exchange 2003 server name> binpath= “<XPR_Install>\bin\ exchapl.exe”
11	XPR Exchange Connector for i386 (<XPR server name>:<Exchange 2007 server name>)	Optional	sc create <XPR server name>:<Exchange 2007 server name> binpath= “<XPR_Install>\bin\ e2k7apl.exe”
11	XPR Exchange UM APL	Optional	sc create exumapl binpath= “<XPR_Install>\bin\ exumapl.exe”
11	XPR Lotus Notes APL (LNApl)	Optional	sc create lnapl binpath= “<XPR_Install>\bin\ lnapl.exe”
11	XPR Lotus Notes UM APL (LnUmApl)	Optional	sc create lnumapl binpath= “<XPR_Install>\bin\ lnumapl.exe”
11	XPR SAP R/3 APL (SapR3Apl)	Optional	sc create sapr3apl binpath= “<XPR_Install>\bin\sapr3apl.exe”
	IMPORTANT: Setting up this APL on a Windows cluster **has been released only project-specifically**.		
11	XPR SAPphone APL(SAPphoneApl)	Optional	sc create sapphoneapl binpath= “<XPR_Install>\bin\sapphoneapl.exe”
	IMPORTANT: Setting up this APL on a Windows cluster **has been released only project-specifically**.		

Table 14 XPR Services to be installed on the second Node on Windows Server 2008/2012

3. Enter the following command in a command prompt:

   ```
   sc create licsvc binpath= ".\OpenScape\xprlicsvc\licsvc.exe"
   ```

   Example:

   ```
   sc create licsvc binpath= ".\OpenScape\xprlicsvc\licsvc.exe"
   ```

   IMPORTANT: Please note that a blank must follow the equals sign.

4. If the prerequisites are not installed correctly, the following error message will appear: "FAILURE: The MRS License Service cannot be installed. The service implementation dependent initialization return FALSE. The Event Log may contain additional information.“ In this case, please follow the instructions given in Section 5.4.1, “Installing “Prerequisites“ on the Nodes”, on page 133.

Now the necessary privileges have to be assigned to the service manually.

5. Open the service management. To do this, click on **Start > Programs > Administrative Tools > Services**.

6. Click the **licsvc** service with the right mouse button.

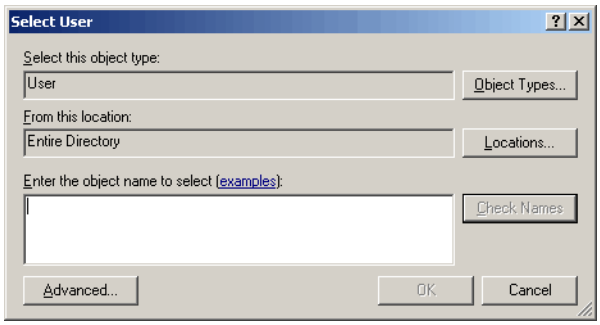
NOTE: The service is not yet displayed as **XPR License Service(licsvc)** in the service management. It is only shown after the reboot of the second node in step 6 on page 187, since not until this reboot the corresponding keys that were replicated from the first to the second node are read out of the registry.

---

7. In the context menu select the **Properties** option and then switch to the **Log On** tab.

   a) Select the option field **This account** and enter the user account. This user is required for the XPR server administration and is identical with the user account already previously used for the XPR shares (see Section 5.7, “Configuring XPR Services as Resources”, on page 152). Enter the password in the **Password** field and confirm it in the **Confirm password** field.

   b) You can also search for a user account. To do so, click on the **Browse...**button. The dialog **Select User** opens.



8. Enter the user account to be searched for in the **Enter the object name to select (examples):** field and click on the **Check Names** button

---

IMPORTANT: If you execute this step for the services **XPR Exchange Connector for i386 (<XPR server name>:<Exchange server name>)** or **XPR Exchange UM APL** (see Table 14 on page 181), a user account with further special privileges must be used for these services instead of the user account described in Section 5.7, “Configuring XPR Services as Resources”, on page 152. The setup and administrator documentation *OpenScape Xpressions Microsoft Exchange Gateway* delivers comprehensive details on the required privileges under the term **Service Account**. Please keep in mind that setting up the Exchange connection requires more privileges than operating it.

---

9. Click on the **OK** button to define the selected user account for the current service.

10. Confirm the dialog with the information that this account has now the privilege to log on as a service by clicking on the **OK** button.

11. Add this user account to the administrator group.

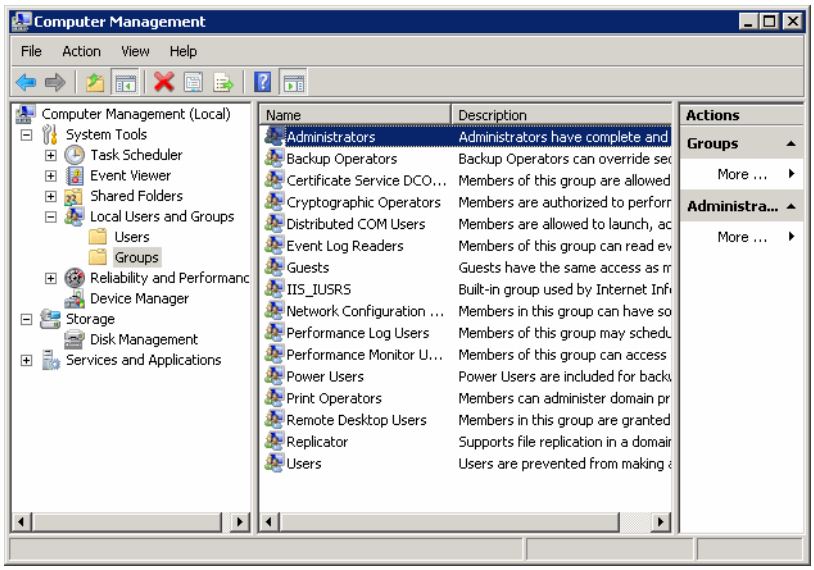
    a) To do so, click on **Start > Programs > Administrative Tools > Computer Management**.

    b) Select in the left list the entry **System Tools > Local Users and Groups > Groups**.

    NOTE: Select under **Windows Server 2008/2012 R2 64 bit** in the list on the left-hand side the entry **Configuration > Local Users and Groups > Groups**.

    ---

    c) Click in the right list with the right mouse button on the group **Administrators**.



    d) Select the **Properties** option from the context menu.

    e) Click the **Add...** button.

    f) Enter the user name in the lowermost field and click on the **Check Names** button.

    g) Click on **OK**.

    h) Click on **OK**.

12. Select the license service entry with the right mouse button in the Failover Cluster Management and then select **Bring this resource online**.

    IMPORTANT: Be sure to execute this step. It may be a requirement for XPR services to be installed mandatorily when such XPR services are installed at a later date.

    If the attempt to bring the resource online fails, you can execute one or both of the following substeps to solve the problem. This depends on whether the resource's state is **Offline** or **Failed** after the attempt or an error message appears:

    a) Repeat step 2 Section 5.5.3, “Removing Xpressions Service Dependencies”, on page 144 for this resource.

    b) Repeat step 2 Section 5.3, “Reassignment of the Computer Name in the Registry”, on page 129 for this resource.

13. Repeat steps 3 on page 182 to 10 on page 184 and step 12 on page 185 for every further mandatory XPR service in the sequence given in Table 14 on page 181.

14. Repeat steps 3 on page 182 to 10 on page 184 and step 12 on page 185 for each optional XPR service in Table 14 on page 181. The sequence is irrelevant.

5.8.3 Installing Hotfixes

Install all hotfixes provided for the XPR version you have purchased.

5.9 Testing the XPR Server in the Cluster

To test the performed installation, carry out a manual failover in the Failover Cluster Management.

1. Open the Failover Cluster Management under **start > Programs > Administrative Tools > Failover Cluster Management**.
2. Bring the first node online again. To this, click with the right mouse button on the corresponding node and select **Resume** from the context menu.
3. Perform a manual failover. In the Failover Cluster Management click with the right mouse button on the application for the cluster in which the XPR server has been installed. Select the menu option **Move this service or application to another node** > **1 - Move to node <name of the first node>** from the context menu.

   All XPR server resources are brought offline on the second node and subsequently rebooted on the first node and brought online.
4. In the Failover Cluster Management click with the right mouse button on the application for the cluster in which the XPR server has been installed. Select the menu option **Move this service or application to another node** > **1 - Move to node <name of the second node>** from the context menu.

   All XPR server resources are brought offline on the first node and subsequently rebooted again on the second node and brought online.
5. A successful test completes the XPR server installation in the cluster. If this test fails, verify that all requirements (Section 5.1, “Checklist for Preparing the Cluster Installation”, on page 127) have been met, check your settings once again, or contact the network administrator in charge.

6. You can reboot the second node for all XPR services to appear in the usual spelling (for example **XPR License Service(licsvc)** instead of **licsvc**) in the service management.

   If after rebooting the second node and initiating a failover from the first to the second node a resource is not automatically brought online on the second node, execute the following substeps:

   a) Execute step 3 on page 145 for the service that corresponds to this resource on the seconds node.

   b) Bring the resource online.

   c) Execute step 3 on page 145 for the service that corresponds to this resource once more.

5.10 Satellite Environment with clustered Kernel Computer

IMPORTANT: Please heed the note for the XPR Connection APL beneath table Table 13 on page 158, “XPR Services that cannot be installed on a Cluster on Windows 2008/2012”.

In a satellite environment with clustered kernel computer, some entries in the cluster's registry must be supplemented. Proceed as follows:

1. Open the Failover Cluster Management and bring the complete application offline.
2. Bring the license service online again. This is required to replicate the modifications performed in the following on the node's registry to the cluster's database.
3. Open the registry on the node on which the license service is currently running and look for the following key:

   `HKLM\SOFTWARE\Wow6432Node\PP-COM\MRS\Services\Kernel`
4. Open this key and verify that the `NameLoc` and `CfgSvc` entries are supplemented with the network name of the corresponding computer for each available satellite.

   Example:

   Supposed, there are two satellite computers with the network name `SATEL1` and `SATEL2`. The corresponding entries in the key then read:

   ```
   NameLoc,SATEL1
   CfgSvc,SATEL1
   NameLoc,SATEL2
   CfgSvc,SATEL2
   ```

   IMPORTANT: Verify that the commas are not followed by blanks.
5. Open the following key:

   `HKLM\SOFTWARE\Wow6432\PP-COM\MRS\Services\Access Protocol Layers`
6. Verify that the network name of the corresponding satellite computer is entered for all APLs that run on one of the satellites. Example:

   Supposed, an ISDN APL runs on the satellite computer SATEL1 and a CTI APL on the satellite computer SATEL2. The corresponding entries in the key then read:

   ```
   IsdnApl,SATEL1
   ```

```
CtiAPl,SATEL2
```

7. Bring the entire application online again.

   Configuring a satellite environment with a clustered kernel computer is thus complete.

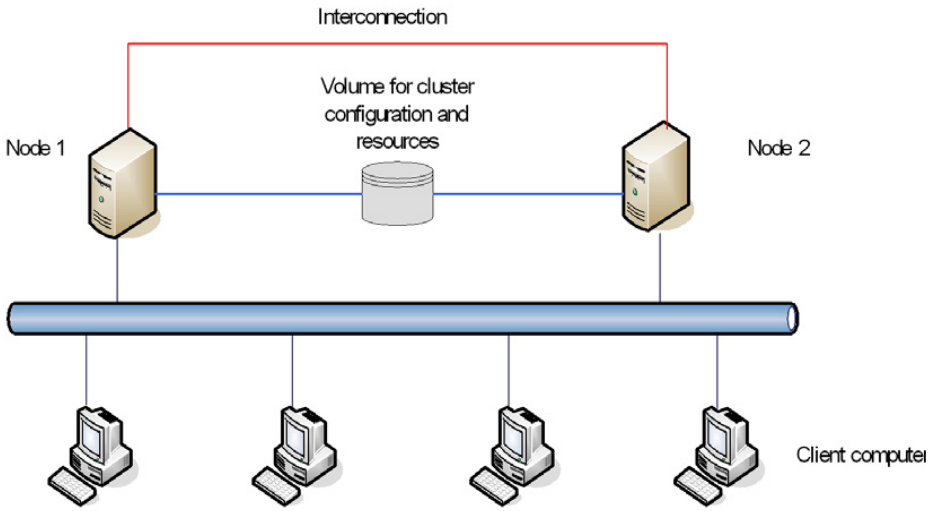
Part 2- XPR Server in the Failover Cluster on Windows Server 2012 R2, 2016, 2019, 2022 and 2025

6 The XPR Server in a Cluster

6.1 Structure of a Server Cluster

A cluster is a group of independent computer systems that are called a node and cooperate as one system. The purpose of a cluster is to provide programs and resources operated on computers of these groups with a higher availability or improved performance to minimize downtimes. There are two types of clusters:

1. In case of a performance cluster, several nodes are combined to increase the performance compared to a single server.
2. In an availability cluster, each node is able to perform the tasks of another node from the cluster if required. If a node is not available owing to maintenance work or technical failures, another node immediately takes over the tasks of the unavailable one.



6.1.1 Nodes

The term node is in this documentation exclusively used as synonym for cluster node. It is not a synonym for satellite node.

In server clusters up to eight nodes can be combined, on which the operating systems Windows operating systems are used.

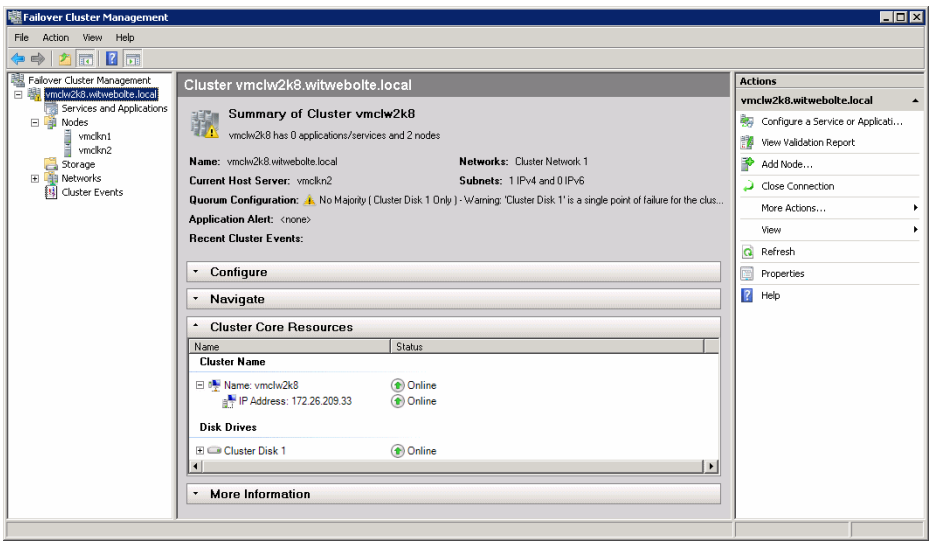
6.1.2 Client Access Point (Virtual Server)

A Client Access Point is an application, the availability or performance of which is increased by a cluster. This application is formed and identified by its IP address and network name. The IP address and the network name must be made known as resource (see Section 3.3.1, “Creating the IP Address and Network Name as Resource”, on page 39).

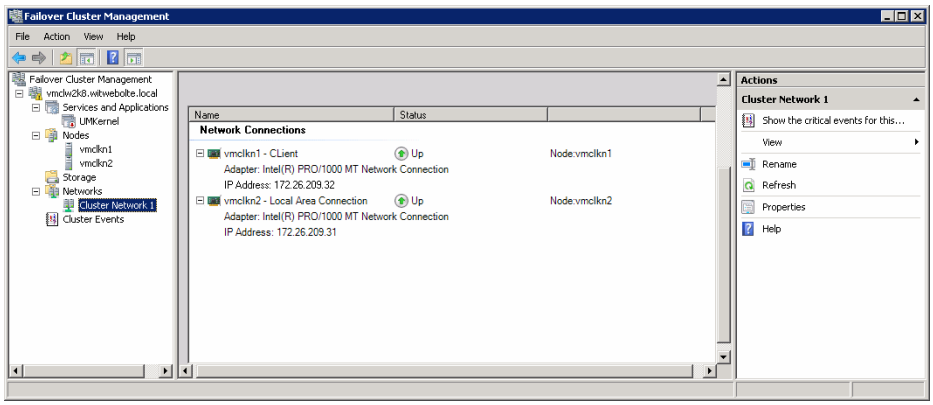
You can see a Client Access Point in the Windows Explorer under **My Network Places > Entire Network > Microsoft Windows Network > <domain name>**.

NOTE: A total of six IP addresses is important for an XPR on a Windows cluster.
- Cluster IP address (see below)
- One IP address from each of the two nodes for the internal cluster connection (Interconnect)
- IP address of the virtual server (see step 8 on page 41)
- One IP address for each of the two nodes (see below.)

When you select the cluster name in the Failover Cluster Manager, the cluster IP address is displayed on the ‘Cluster Core Resources’ frame:



When you open **<Clustername>** > **Networks** > **Cluster Network 1** in the Failover Cluster Management, the IP addresses of the two nodes are displayed:



6.1.3 Resources

The term resource is in this documentation exclusively used as synonym for cluster resource.

Each physical or logical component of a Client Access Point the availability or performance of which is to be increased by the cluster must be configured in the Failover Cluster Management (see below) as resource. Each resource is of a type, for example

1. Physical hard disk
2. Share
3. Network name and IP address. These two resources form a Client Access Point.
4. General service

Each resource has the following properties:

1. A resource may be brought online or offline.
2. Resources may be administered in a server cluster.
3. Resources must be combined in applications (cf. Section 6.1.7, “Cluster Communication”, on page 198).
4. An application, and thus also the resources it combines, can only be assigned to one node within a cluster. If a resource of this application is brought online, it is brought online only on this node.

Resources may be used independently from each other or be furnished with dependencies, i.e. operating a resource requires the previous operation of another resource. Such dependencies affect bringing resources online and offline. Example:

A resource A depends on another resource B.

Before you can bring resource A online, resource B must therefore already be online. Bringing resource A online is otherwise not possible.

When bringing resource B offline, resource A must be brought offline first, since it depends on resource B.

The assignment of resource dependencies is mandatory, as soon as a resource directly depends on another. Even if such dependencies are not mandatory it may be useful to establish them for coupling not directly dependent resources to the functions of others.

A resource can only depend on another resource of the same application.

6.1.4 Quorum Resource

In each cluster a resource is defined as quorum resource (voting disk), with which configuration data is administered for restoring and maintaining the data integrity of the cluster. This quorum resource must provide physical memory and is therefore a physical drive in an application (quorum drive). All current cluster configuration data and information is stored on this quorum drive.

If the internal cluster connection (interconnect) is interrupted, two nodes or node groups can be separated from each other. In this situation (split-brain situation), both nodes will attempt to represent the entire cluster. But since only one node may be active, the quorum resource decides which of the two nodes is assigned the resources.

If a node is changed (cf. Section 6.1.9, “Failover and Failback”, on page 199), the first entity of the Failover Cluster Management will first store all necessary information on the management's drive. Not until then the node is changed and the second entity of the Failover Cluster Management reads the current configuration data from the quorum drive and reboots the resource.

6.1.5 Applications

An application combines several resources into larger logical units. Typically, the resources of a Client Access Point are combined into an application, but it is not mandatory. Such applications define the units for a failover or failback (cf. Section 6.1.9, “Failover and Failback”, on page 199). If one of the resources fails, the cluster service automatically shifts all resources to another node and reboots them there.

An application may only be assigned to one node each, and a single resource only to one application. Such relations ensure all resources of an application to be always active on the same node.

NOTE: Besides the application for the XPR server, further applications, for example for an Exchange server, may exist. We do not recommend this, though.

6.1.6 Cluster Service and Failover Cluster Manager

On each node operates a cluster service that controls all node, application and resource functions within the cluster and communicates with the cluster services of all further nodes. In combination with other components such as cluster network driver, cluster harddisk driver, resource monitors, etc., the cluster service forms the Failover Cluster Manager.

6.1.7 Cluster Communication

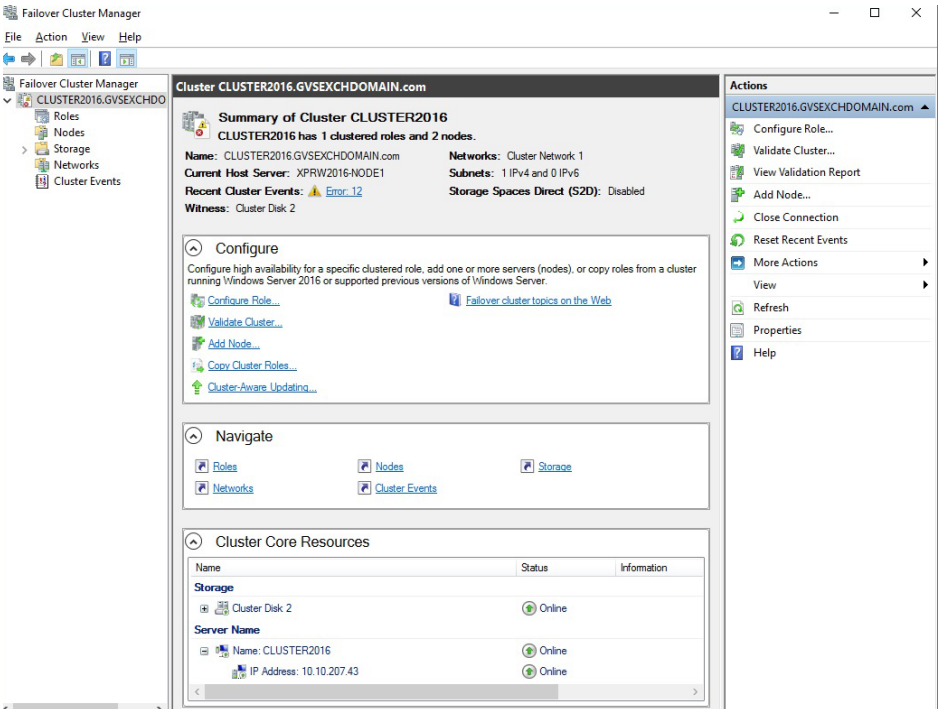
All nodes are interconnected via one or several, physically independent network connections. Via this connection the nodes exchange special messages with which the resource transmission can be triggered at a specific time. Communication with the client network is enabled via a network interface separated from the interconnect connection.

Each node can access the storage devices, which are protected from failures of single disks by RAID. Such data carriers hold the entire resource and configuration data of the cluster. In this way, each node is given access to the entire data of the cluster configuration.

Only one entity of the Failover Cluster Manager can access a data carrier though. If no hardware failures occur, possession of a data carrier may be automatically (for example in case of an error) or manually (for example in case of maintenance) be transferred to another entity.

6.1.8 Cluster Administration

The nodes are administered by a central computer using cluster administration software (Failover Cluster Manager/Manager). This software is operated either on one of the nodes or on another computer outside the cluster and can administer the single nodes remotely.



6.1.9 Failover and Failback

If an error occurs with a resource in a server cluster, the cluster service will first attempt to reboot the resource on the same node. If this attempt fails, the application's resources are shifted to another node within the server cluster and rebooted there. In this process, all resources are first brought offline on the first node. Then, the application is shifted to the second node and subsequently be brought online again under consideration of the set dependencies. This process is called failover.

If a node on which resources are active becomes inactive, the cluster service performs a failover and transfers all applications and resources to another node. When the node originally used is active again, the cluster service can perform an automatic failback.

All resources can be set in a way that they can trigger a failover if they close down themselves a specific number of times within a specific period owing to an error. This setting, however, is only required for the most important resources, the kernel resources. Other, less important resources should not be allowed to trigger a failover. Which resource is a kernel resource depends on the priorities of a cluster installation's operator. Our recommendation is that the following resources are kernel resources:

- Resource of type **IP Address** (see step 9 on page 41)
- Resource of type **Network Name** (see step 9 on page 41)

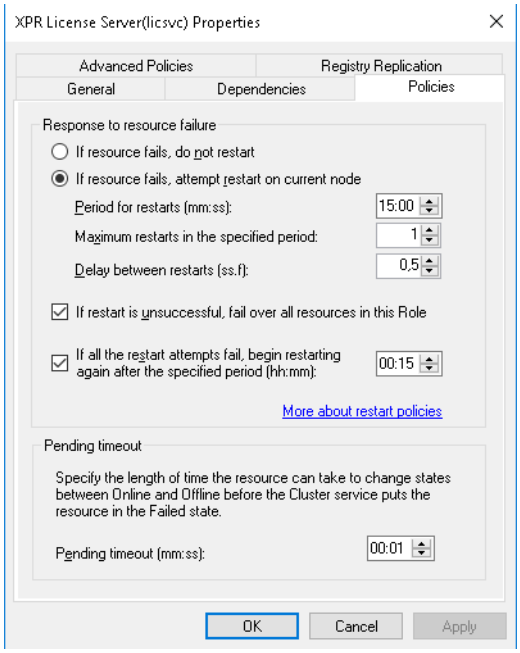
NOTE: These two resources form the Client Access Point.

NOTE: The cluster drive (Cluster Disk 2) need not be separately listed since the resources of type IP Address and Network Name depend on the cluster drive. Consequently, if the cluster drive fails, a possible failover is triggered by the resources of type IP Address and Network Name and not by the cluster drive.

- Resource of type **File Server**, which represents all network shares (see step 5 on page 151)
- XPR License Service (licsvc) (see step 13 on page 166)
- XPR Name Locator (nameloc) (see step 22 on page 169)
- XPR Configuration Service (cgfsvc) (see step 22 on page 169)
- XPR Status Dispatcher (xmrsvc) (see step 22 on page 169)
- XPR Information Store (infostor) (see step 22 on page 169)
- XPR Message Router (mta) (see step 22 on page 169)
- XPR Administrator (mrs) (see step 22 on page 169)

Please check with the cluster installation operator to define how often a resource must fail and the period in which such failures occur until a failover is triggered. These specifications will later be required when you configure the resources.

The License Service configuration (see step 13 on page 166) may serve as example here:



If the **If resource fails, attempt restart on current node** radio button is active in the **Response to resource failure** section and the resource is not operating anymore, the attempt is made to reboot it.

The **Period for restarts (mm:ss)** and **Maximum restarts in the specified period** fields specify the framework conditions for this. The **Period for restarts (mm:ss)** field indicates the time span in which attempts are made to automatically start the resource, and the **Maximum restarts in the specific period** field specifies the maximum number of such attempts made within the given period. If, for example, the **Maximum restarts in the specified period** field has value `3` and the **Period for restarts (mm:ss)** field value `15:00`, a maximum of three attempts is made within 15 seconds to automatically restart the resource.

The **If restart is unsuccessful, fail over all resources in this service or application** check box specifies what happens if the service could not be rebooted after the number of attempts given in the **Maximum restarts in the specified period** field within the **Period for restarts (mm:ss)**. With this check box being active, a failover of the application is attempted for the XPR.

6.1.10 Continuative general Information about Server Clusters

You find continuative general information about the server cluster topic in the Windows product documentation or in the TechNet section at the Microsoft Website.

6.2 XPR Server Installation in the Cluster

When installing the XPR server in the cluster, some specials must be considered:

1. The XPR server in a cluster is always operated in an availability cluster, i.e. always only one node may operate as XPR server.
2. Setting up a server cluster is not part of this documentation and incumbent on the customer prior to the XPR server installation. Therefore, please consult the network administrator or IT department in time for clarifying the necessary requirements on the IT systems and the technical options before the installation (cf. Section 3.1, “XPR Server Pre-installation Checklist”, on page 29).
3. During the setup, the XPR server configuration and different resources must be replicated to any further node of the cluster. This process requires single nodes to be brought offline during the installation, respectively single server services to be temporarily deactivated. Therefore verify that the ongoing operation is not imperiled by the setup routine.
4. For availability reasons, some XPR server system components that can be locally installed in case of a single installation may not be installed on one of the nodes but must be stored on one or several satellite systems.
   a) Some XPR components must not be installed on a Windows cluster (see the end of Section 5.7.1, “Overview”, on page 152). These components must be installed on one or several redundant satellite systems.

      An IP APL can be operated in parallel to an ISDN APL on one computer.

   b) All external additional components such as client modules, interfaces, etc. must not be selected for installation on the cluster, but are installed on satellite systems.
5. The XPR server setup in the cluster requires some components to be executed respectively installed locally on each node and such nodes to be rebooted during the installation. Therefore, verify in the run-up to the installation,
   a) that you can directly access the single nodes,
   b) that you can connect a setup medium to the nodes or that the nodes can access the installation data via the network,
   c) that each node on which the XPR server is to be installed can be rebooted in the ongoing operation without interrupting the ongoing cluster operation.
6. On the two cluster nodes the following programs may be locally installed on the nodes but not on the cluster:

a) Client License Management (CLM)

b) Crystal Reports

IMPORTANT: Please note that a license must be purchased for each node.

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c) Business Intelligence and Reporting Tool (BIRT)

d) Text-To-Speech (TTS)

e) Automatic Speech Recognition (ASR)

NOTE: TTS and ASR have been released only for specific operating systems and only on real hardware or on VMware ESX 4.0. Please refer to the OpenScape Xpressions Release Notice to see which operating systems have been released.

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f) Application Builder

7. The following programs or services can be installed neither on the cluster nor locally on the node:

   a) Connection APL

      - UCC
      - Web conference server
      - PostgreSQL database
      - Microsoft SQL Server 2005 Express
      - optiClient 130 Web

   b) Smart Services Delivery Platform (SSDP; see the directory XpressionsInstall\`AddOn\Misc\SSDP\` on the setup medium)

8. Table 12 on page 154 shows the XPR services that are mandatory in every XPR server in the cluster or are available optionally.

IMPORTANT: Please note that in this table we differentiate the services as regards general and limited availability (see also the note that precedes Table 12 on page 154).

Table 13 on page 158 shows the XPR services that cannot be installed on a Windows cluster.

IMPORTANT: All APLs mentioned neither in Table 12 on page 154 nor in Table 13 on page 158 may only be installed on the cluster after a project-specific release.

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9. If you do not perform the application conversion with Ghostscript but with Microsoft Office, you need to install Microsoft Office on both nodes. Please remember that you need two licenses for this purpose. Please also note the information about the application conversion with Microsoft Office in the OpenScape Xpressions *Server Administration* manual.

7 Initial-Installation Preparations

7.1 XPR Server Pre-installation Checklist

Step
1. Section 7.1, “XPR Server Pre-installation Checklist”, on page 205
2. Section 7.2, “Creating a new role for the XPR Server in the Cluster”, on page 214
3. Section 7.3, “Specifying new Resources for the XPR Server in the Cluster”, on page 216

Topic	Description
Information to be provided by the customer:	
IP settings	Address, gateway, DNS server, and possibly the VoIP servers' addresses
Passwords	Local and Domain.
Fax document type	Which document types are sent by fax (suitable conversion software to be provided)?
Numbering plan	The numbering plan agreed with the customer must be available.
Cluster system check before installing the software:	
Hardware	The hardware used must have been tested and released by the producer of the operating system. Please read the note for this in Section 7.1.1, “Hardware Environment at the Setup Site”, on page 206. Remove superfluous hardware from the server PC (e.g. sound cards).
Operating system (Configuration)	See Section 7.1.3, “Checking the Windows Server 2012/2016 Settings”
LAN integration	Verify that the server PC is correctly integrated into the customer LAN.
Cluster preparation	Check whether the resources (IP address and network name) already exist for the XPR server to be installed. If not, define these new resources after consulting the network administrator (see Section 7.3, “Specifying new Resources for the XPR Server in the Cluster”, on page 216).
Miscellaneous	Before the software installation, shut down all applications running in the background (for example antivirus programs). After the successful installation such applications can be rebooted.

7.1.1 Hardware Environment at the Setup Site

IMPORTANT: The hardware used must have been tested and released by the producer of the operating system. You find information about tested and released hardware under the following address:

http://www.windowsservercatalog.com/default.aspx

Follow here the link **Cluster Solutions** in the **Hardware testing status** column.

Before the actual implementation begins, make sure that the required hardware environment is available on site. This comprises:

- A Windows Server 2012/2016/2019/2022/2025 cluster system with a least two nodes, previously installed by the customer and ready for operation.
- Access to an administration station for the cluster system
- Wired LAN sockets and LAN wires
- Additional network connections 230V (USA: 110 V) for additionally required hardware, such as a protocol tester or an external setup medium.

You find details on implementing and assembling the communication system on a satellite system in the respective service manual.

7.1.2 Checking the System Requirements for the Server PC

IMPORTANT: The installation in the cluster system requires the necessary communication hardware to be installed on the Windows cluster or on a satellite system.

Please note that we differentiate between general and limited availability, as is also outlined in point 8 on page 27 and described in detail in Table 4 on page 44.

PC Hardware/Software (New Installations)

The following minimum requirements should be met:

- **Processor**
  - Intel Xeon E5-2670 v3 @ 2.30GHz (or higher)
- **Working memory**
  - 4 GB (recommendation: 8 GB)
  - in case of TTS usage
    - additional 100 MB per installed TTS voice of Nuance Vocalizer for Networks 5 and
    - additional 2MB per channel

    at least, however, additional 1024 MB
  - in case of ASR usage 512 MB in addition
- **Hard disks**

  2 hard disks, each of them with at least 200 GB on cluster drive
  Average I/O latency: 10ms

IMPORTANT: Be sure that the partition on which the XPR server software is installed has a minimum size of 10 GB. The target path must not contain any blanks (e.g. r:\OpenScape Xpressions\xpr)!

- **Data availability**

  It is in most cases available as RAID drive in the cluster.

IMPORTANT: A cluster is no replacement for a data backup. We urgently recommend to fully integrate the cluster in a data backup strategy.

- **USB connection**

  It serves for installing the OpenScape Xpressions system from an alternative setup medium, for example an external harddisk.

- **LAN**

  Ethernet 100 Base T or Gigabit

  - The network board must be connected with the LAN to ensure trouble-free XPR server booting.
  - The network board settings must correspond to those of the router/HUB.
  - An MS Loopback Adapter must have been installed (see OpenScape Xpressions *Server Installation* manual).

IMPORTANT: When replacing the network board or modifying the configuration (hardware), the MAC-ID used must be checked as it may have changed and a new license file may have to be created. In this case, the old MAC ID is disabled and no further license files may be generated for this MAC ID. Likewise, the licenses for this MAC-ID can no longer be extended.

- **Operating systems**

  Refer to the service documentation *OpenScape Xpressions Release Notice* for details about the supported operating systems.

- **Protocol stack**

  Correctly configured TCP/IP protocol stack

IMPORTANT: The installation of an XPR system on substituted drives is not possible, since the setup program cannot create the required directory shares of the XPR system.

IMPORTANT: Installing the XPR system on a domain controller is not permitted.

Sangoma ISDN boards

IMPORTANT: Please note that we differentiate between general and limited availability, as is also outlined in point 8 on page 27 and described in detail in Table 4 on page 44.

IMPORTANT: At times, Sangoma uses different version numbers for the same board. For example, the hardware description features a specific version number for a board, but in the Sangoma Diva Configuration Manager you find another version number for the same board. The version numbers used for Sangoma ISDN boards in this XPR V7 guide are always the version numbers specified in the Sangoma Diva Configuration Manager!

Refer to the *OpenScape Xpressions Release Notice* for a list of the supported Sangoma ISDN boards.

The following Sangoma ISDN PRI boards of version 2.0 are supported for upgrades only. The corresponding drivers do not support voice conferences. These Sangoma ISDN PRI boards of version 2.0 are not supported by the drivers (version 8.5.7) on the XPR V7 setup medium. **The drivers on the XPR V7 setup medium must not be installed when Sangoma ISDN PRI boards of version 2.0 are used!**

- Diva PRI/E1/T1 boards (version 2.0)
  - Diva PRI/E1/T1-8 PCI
  - Diva PRI/E1-30 PCI
  - Diva PRI/E1-30 PCIe

- Diva PRI/T1-24 PCI
- Diva PRI/T1-24 PCIe

Mixed operation between different BRI or PRI cards as well as mixed operation of BRI and PRI cards on a server computer is not released.

IMPORTANT: Using more than 3 Sangoma-4BRI boards in the CorNet-T context may lead to a faulty call forwarding connection.

7.1.3 Checking the Windows Server 2012/2016 Settings

- **Computer name**

  IMPORTANT: The name of the computer on which the XPR is installed must not exceed 15 characters.

- **Harddisk configuration**

  You perform the cluster installation of the XPR software on a cluster drive. Verify that the available disk size of the cluster drive is at least 10 GB. On this drive, the XPR software, user data and mailboxes are used and it stores the system and registry data required for replicating the cluster system.

  Verify that the partition is an NTFS partition, so that the enhanced security mechanisms and the scalability can be used.

- **Windows DHCP service**

  This service is usually not installed on Windows Server 2012/2016/2019/ 2022/2025. If it is installed, uninstall it under **Start** > **Settings** > **Control Panel** > **Programs** > **Programs and Features** > **Turn Windows features on or off**.[1]

  On the "Add Roles and Features Wizard" select your server.
  On Features uncheck **Remote Server Administration Tools > Role Administration Tools > "DHCP Server Tools**".

- **SMTP service**

  Remove the SMTP service of Windows because the XPR server offers its own SMTP connection that conflicts with the Windows service. Uninstall the service via **Start** > **Settings** > **Control Panel** > **Programs** > **Programs and Features** > **Turn Windows features on or off**.[1]

  On the "Add Roles and Features Wizard" select your server.
  On Features uncheck "SMTP Server".

- **Internet Information Server (IIS)**

  This service is usually not installed on Windows Server 2008 R2 und auf Windows Server 2012 R2. If it is installed, uninstall it under **Start** > **Settings** > **Control Panel** > **Programs** > **Programs and Features** > **Turn Windows features on or off**.[1]

1. If you have set the classic Control Panel view the following path applies:
Start > **Settings** > **Control Panel** > **Adminstrative Tools** > **Server Manager** > **Features** > **Remove Feature** > ....

On the "Add Roles and Features Wizard" select your server.
On Features uncheck **Remote Server Administration Tools > Role Administration Tools > "Web Server (IIS)Tools**".

- **Network integration**

  The LAN connection of the computer on which the XPR system is to be installed must be established **before** the XPR software setup, since otherwise the network services cannot be started by the operating system.

  When you replace a network adapter, a new license must be created for the MAC address of the new network adapter. The MAC address of the old network must be known as well for this purpose.

- **DHCP client**

  Stop and deactivate the **DHCP Client** in the service management via **Start > Windows > Administrative Tools > Services**.

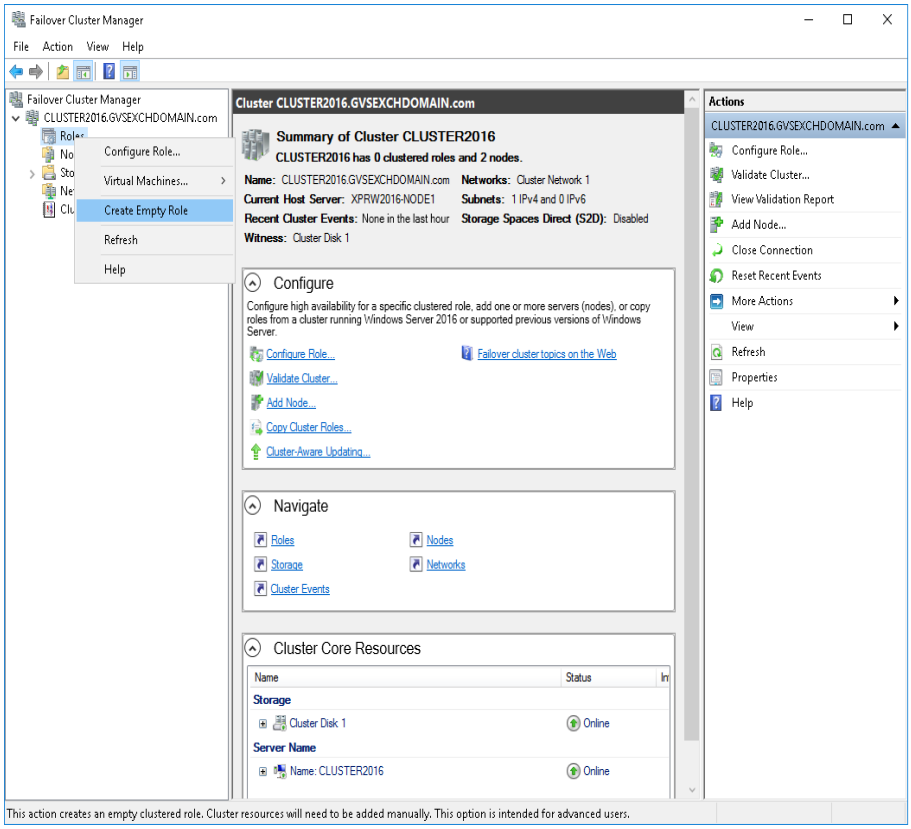
- **Antivirus software**

  To avoid installation errors, deactivate the antivirus software during the installation.

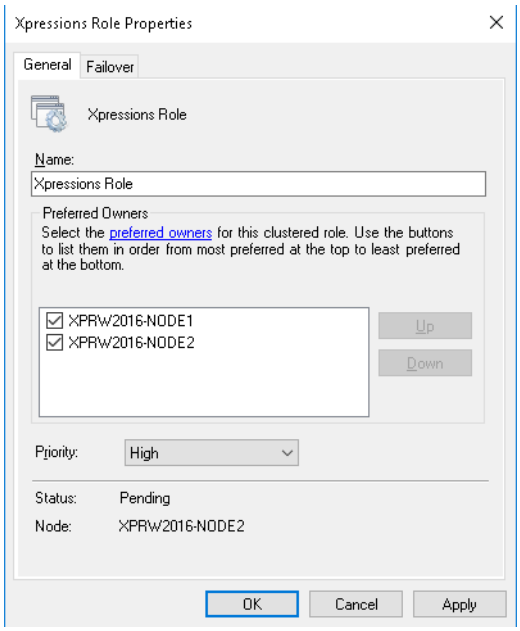
7.2 Creating a new role for the XPR Server in the Cluster

Please ask the network administrator in charge for the cluster name of the XPR server to be installed.

1. In the Failover Cluster Manager right-click on **Roles**.
2. Select **More Actions...** > **Create Empty Role**.



3. Right-click the newly created entry and select **Properties**.



4. Enter a name for the application in the **Name** field, for example `Xpressions Role`.
5. In the **Preferred owners** field activate the nodes on which the XPR is to operate at a later date.
6. Set the Role **Priority** to **High**. Clustered roles with higher priority are started and are placed on nodes before those with lower priority.
7. Click on **OK**.

7.3 Specifying new Resources for the XPR Server in the Cluster

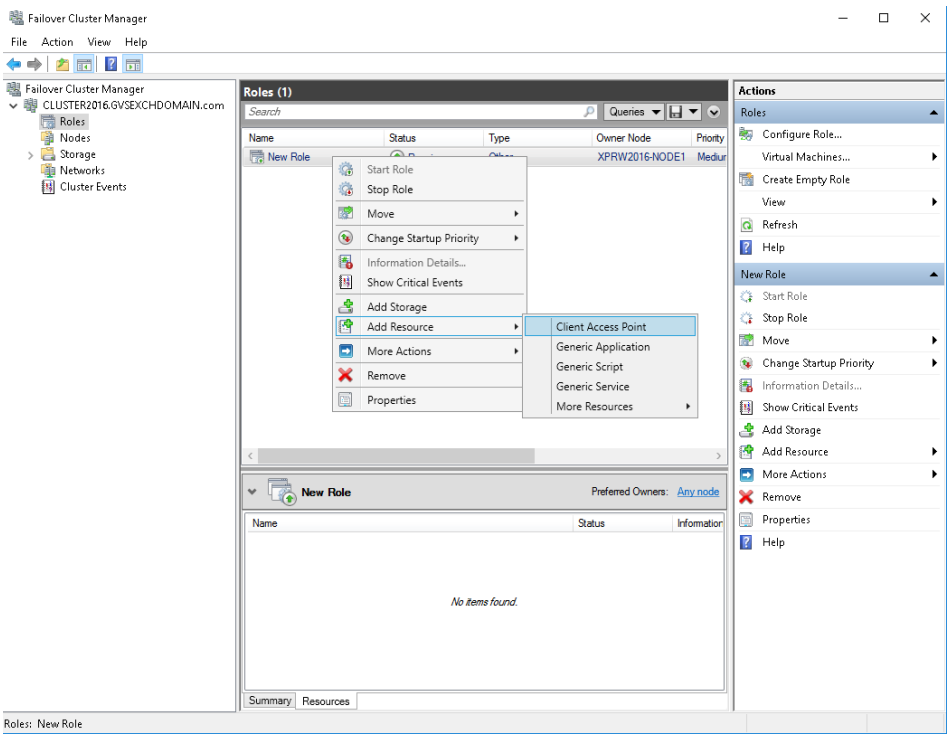
Please contact the network administrator in charge to be given the IP address and network information of the XPR server to be installed.

7.3.1 Creating the IP Address and Network Name as Resource

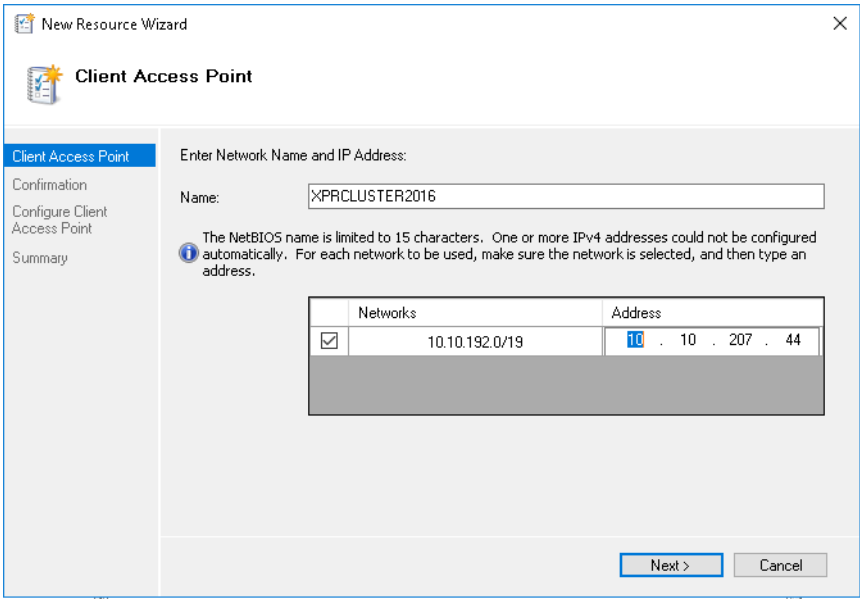
If the network administrator has already defined an IP address and a network name for the XPR server in the cluster, you can skip this section and continue with Section 7.3.2, “Testing the new IP Address and Network Name in the Cluster System”, on page 222. If no IP address and network name have yet been defined for the XPR server in the cluster, you need to execute steps 1 on page 216 to 9 on page 219 described in the following.

A new resource of type IP address is necessary to create together with a resource of type network name a virtual server on which XPR runs. This virtual server makes network access to XPR available.

1. In the Failover Cluster Manager, right-click the application created in Section 7.2, “Creating a new role for the XPR Server in the Cluster” for the XPR server.



2. Select the menu option **Add Resource** > **Client Access Point** in the context menu.



3. Set the **Name** field to the network name of the virtual server. The field is allocated with the application name. Change the name to prevent application names and network names from getting confused (example: XPRCLUSTER2016).

IMPORTANT: The NetBIOS must not exceed 15 characters.

---

4. Click on **Click here to type an address**.
5. Enter the IP address of the application or of the virtual server.

IMPORTANT: Do not enter the IP address of the cluster (see Section 2.1.2, “Client Access Point (Virtual Server)”, on page 18).

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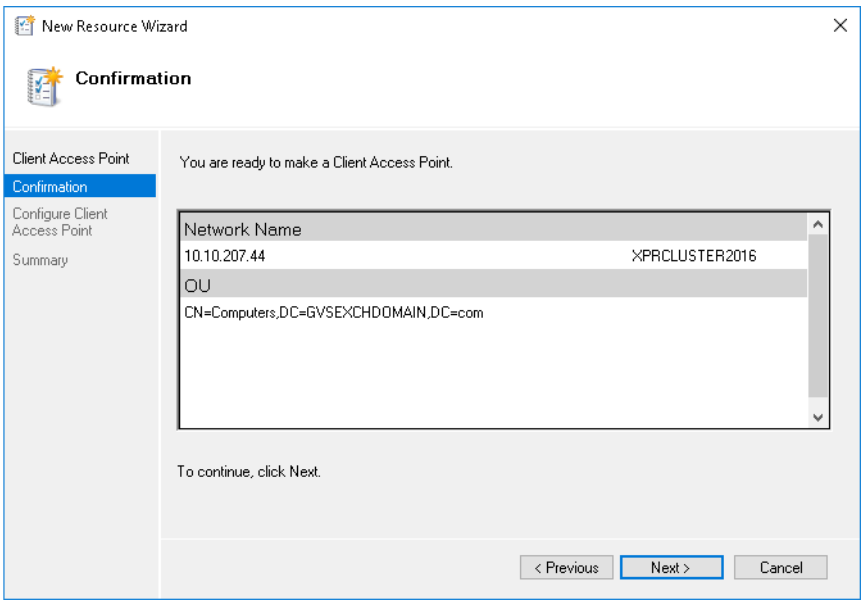
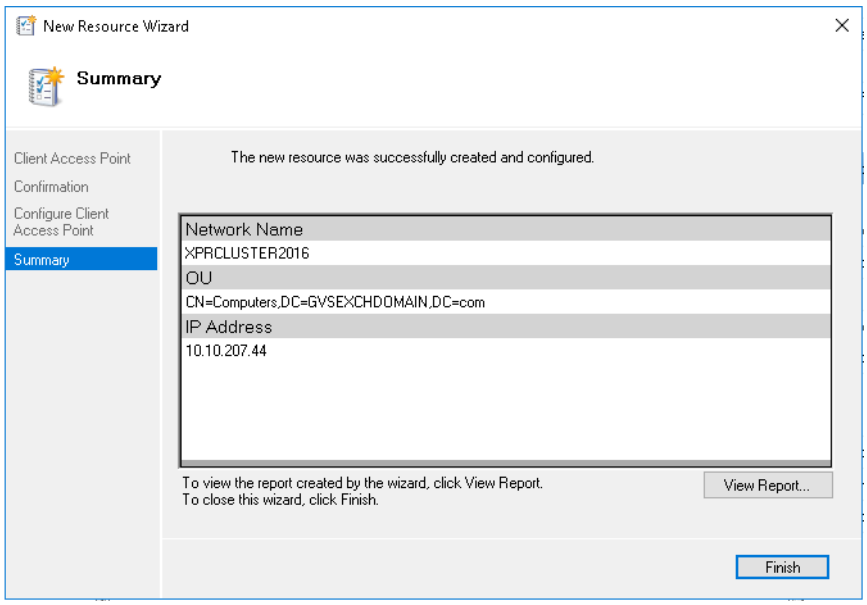
6. Click on **Next >**.

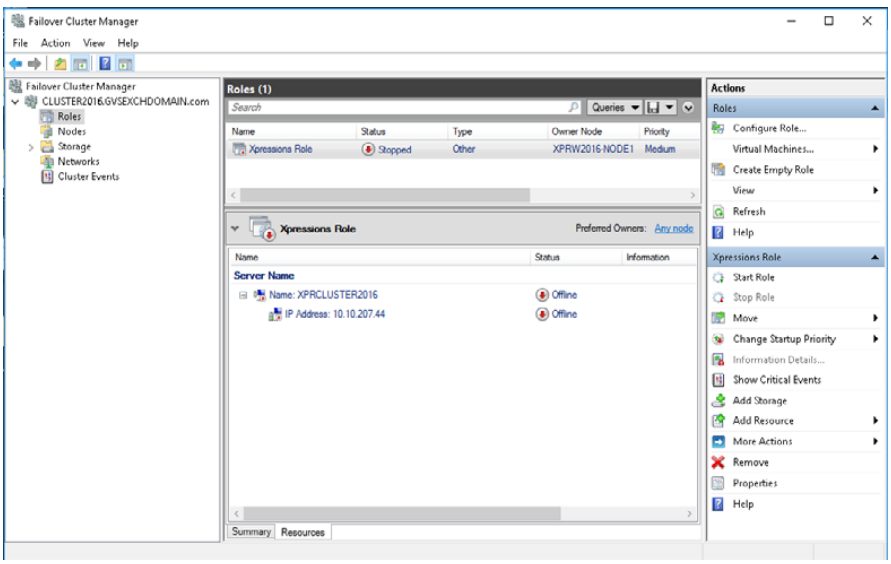

New Resource Wizard
Confirmation
Client Access Point
Confirmation
Configure Client Access Point
Summary
You are ready to make a Client Access Point.
Network Name
10.10.207.44
XPRCLUSTER2016
OU
CN=Computers,DC=GVSEXCHDOMAIN,DC=com
To continue, click Next.
< Previous
Next >
Cancel

7. Click on **Next >**.



8. Click on **Finish**.

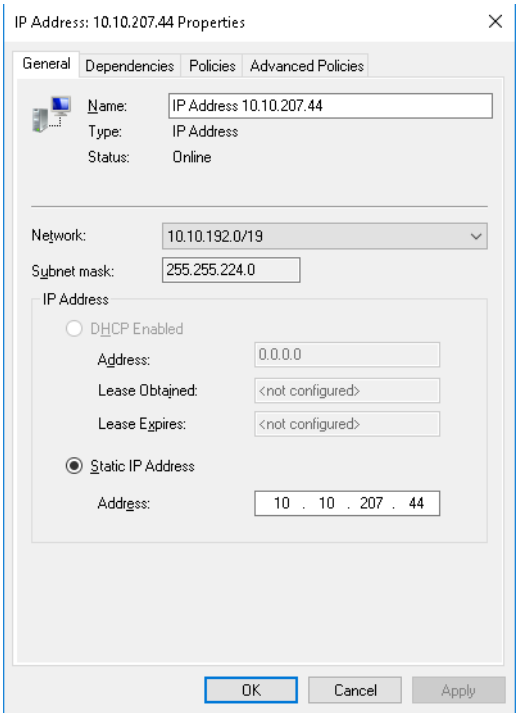
9. The middle section of the Failover Cluster Manager shows now the just created resources:



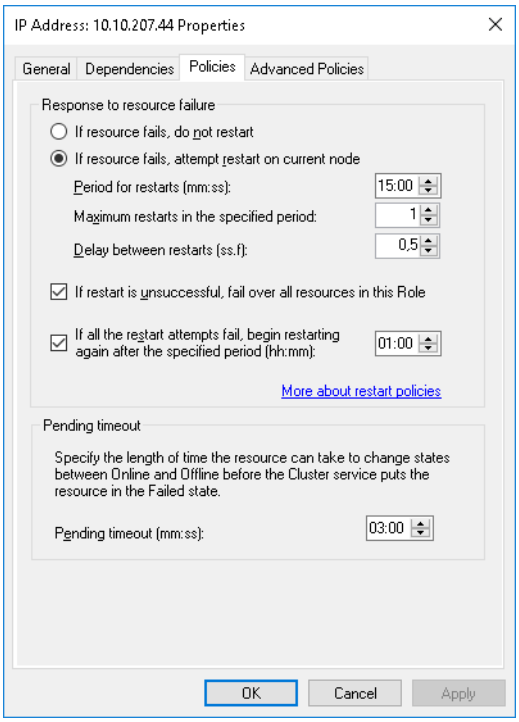
These two resources were created in the application in which the XPR server is to be installed. When the two resources are brought online, the virtual server of this application appears in the Windows Explorer under **Network** > **<network name>**.

10. Execute the following substeps to configure a failover initiation by the resource of type IP Address.

a) Rightclick the resource **IP Address: <IP address>** and select **Properties**.



b) Click on the **Policies** tab.



c) Perform the settings according to the description in Section 6.1.9, “Failover and Failback”, on page 199.

d) Click on **OK**.

7.3.2 Testing the new IP Address and Network Name in the Cluster System

Testing the IP address

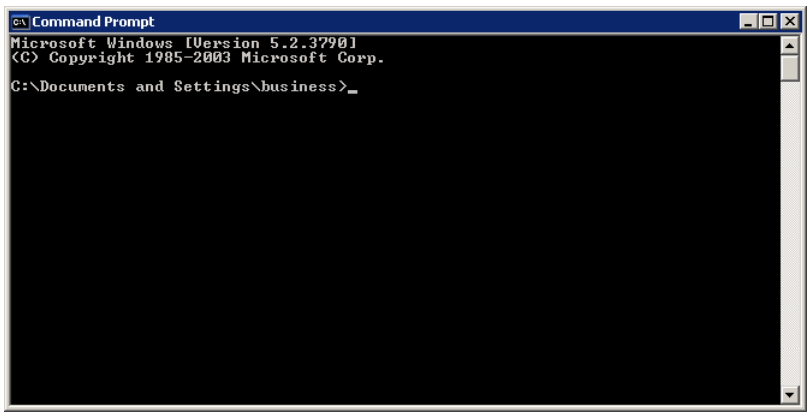
1. In the Failover Cluster Manager rightclick the previously created resource **IP Address: <IP address>** *a*nd select the menu option **Bring this resource online** from the context menu.

   In the middle section of the Failover Cluster Manager the value in the **Status** column must change to **Online** after a short period for the selected IP address.

2. Execute the following substeps to ping this address for testing the availability of the IP address in the network.

   a) Click on **Start > Windows > Accessories > Command Prompt**.

   b) or click on **Start > Run** and enter the **cmd** command in the **Open** field.



3. Enter the command `ping xxx.xxx.xxx.xxx` in the command line. `xxx.xxx.xxx.xxx` is here the wildcard for the previously specified IP address of the XPR server in the cluster system to be installed (see step 5 on page 217).

4. If the server in the cluster system does not respond to the ping command, make sure that all requirements (Section 7.1, “XPR Server Pre-installation Checklist”, on page 205) have been met, check your settings once again, or contact the network administrator in charge. Otherwise, continue with the next step.

5. Return to the Failover Cluster Manager.

Testing the network name

6. In the middle section of the Failover Cluster Manager, rightclick in the **Server Name** category the entry **Name: <network name>** .
7. Select the **Bring this resource online** option from the context menu.

   In the middle section of the Failover Cluster Manager, the value in the **Status** column for the **Name: <network name>** resource must change to **Online** after a short period.
8. Perform a changeover of the cluster to another node.

   a) In the left-hand section of the Failover Cluster Manager, rightclick the application for the XPR server to be installed.

   b) Select the menu option **Move > Select node** from the context menu and select a different node**.**

   c) Click on **OK**.

   In the middle section of the Failover Cluster Manager, the value in the **Status** column for the selected Client Access Point must change to Online after a short period. After this change, the network name of the second node must be the value for **Owner Node**.
9. Enter the command `ping xxx.xxx.xxx.xxx` in the command line once more. `xxx.xxx.xxx.xxx` is here the wildcard for the previously specified IP address of the XPR server in the cluster system to be installed (see step 5 on page 217).
10. Make sure that the server in the cluster system responds to the PING command, otherwise check your settings once again or contact the network administrator in charge.
11. In the left-hand section of the Failover Cluster Management, rightclick the application for the XPR server to be installed.

    a) Select the menu option **Move > Select node** from the context menu and select a different node.

    b) Click on **OK**.

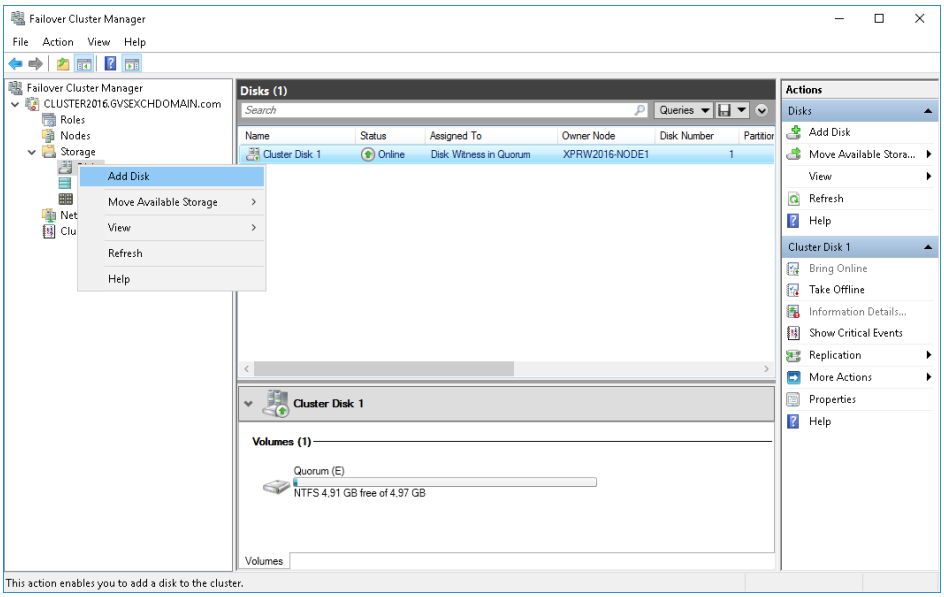
NOTE: If this test fails, verify that all requirements (Section 7.1, “XPR Server Pre-installation Checklist”, on page 205) have been met, check your settings once again or contact the network administrator in charge. If this test is successful, you can continue with the next preparation step.

7.3.3 Creating a Cluster Drive

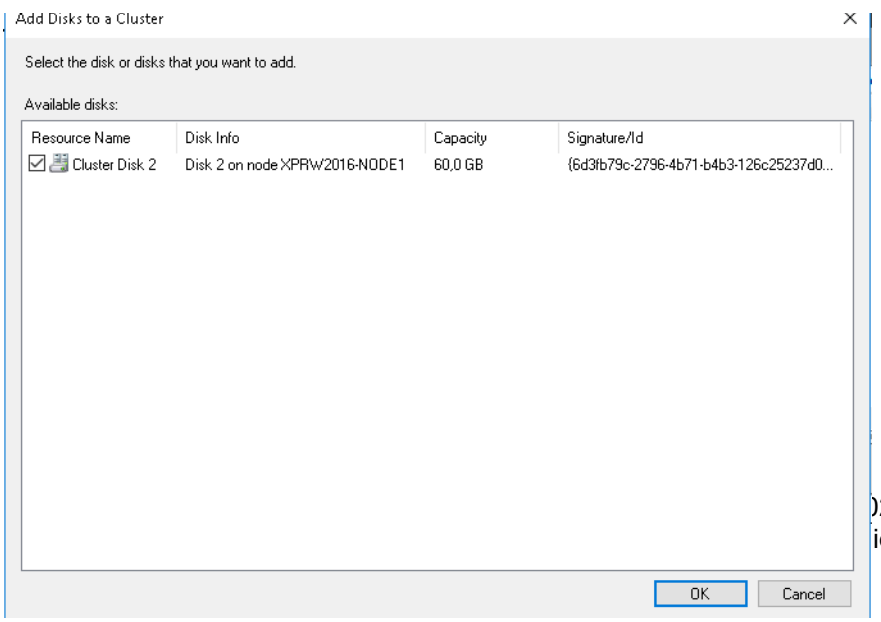
1. In the left-hand section of the Failover Cluster Manager, expand the **Storage** session.

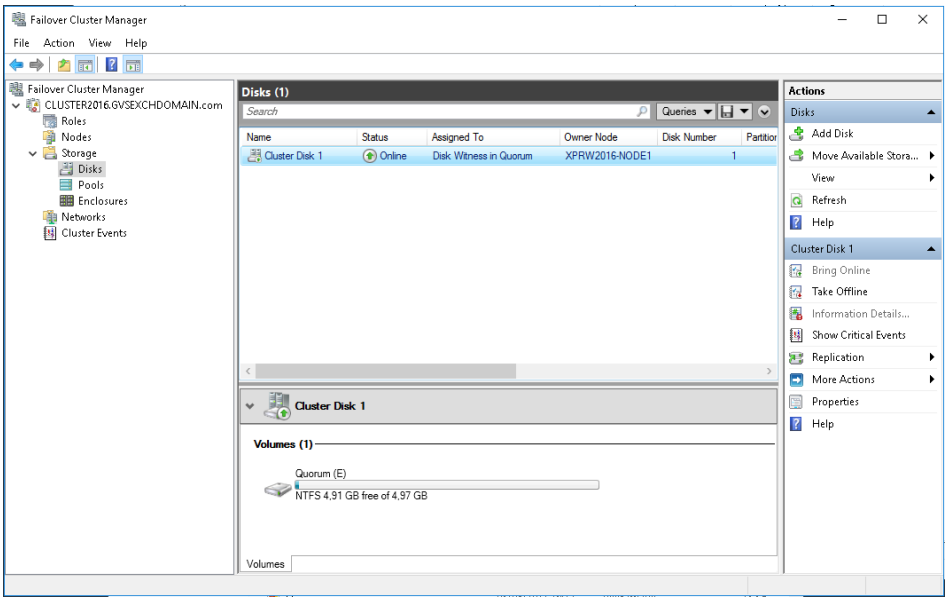
2. Rightclick the **Disks** option.

3. Select **Add Disk**.



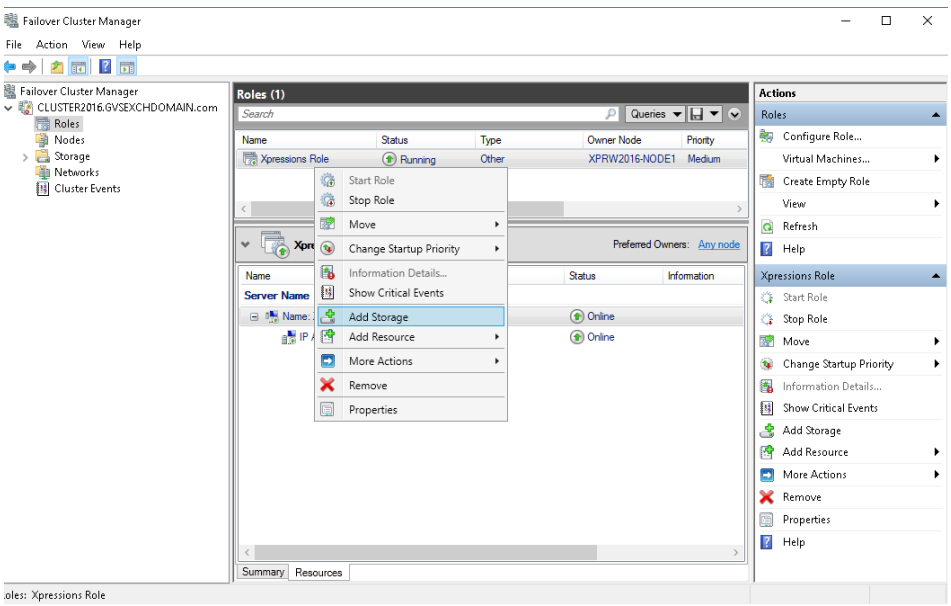
4. Select the disk you will use to install Xpressions and will add as a storage to the Xpressions Role.



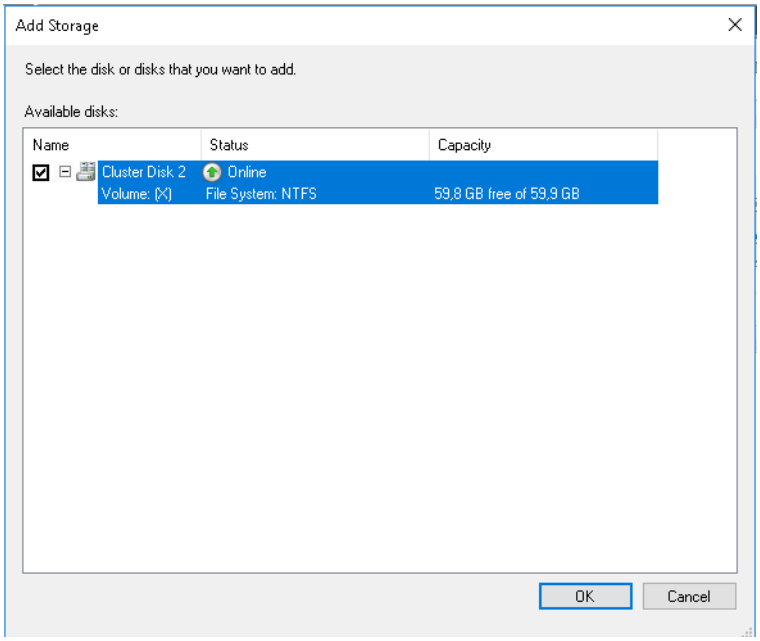


5. Click **OK**

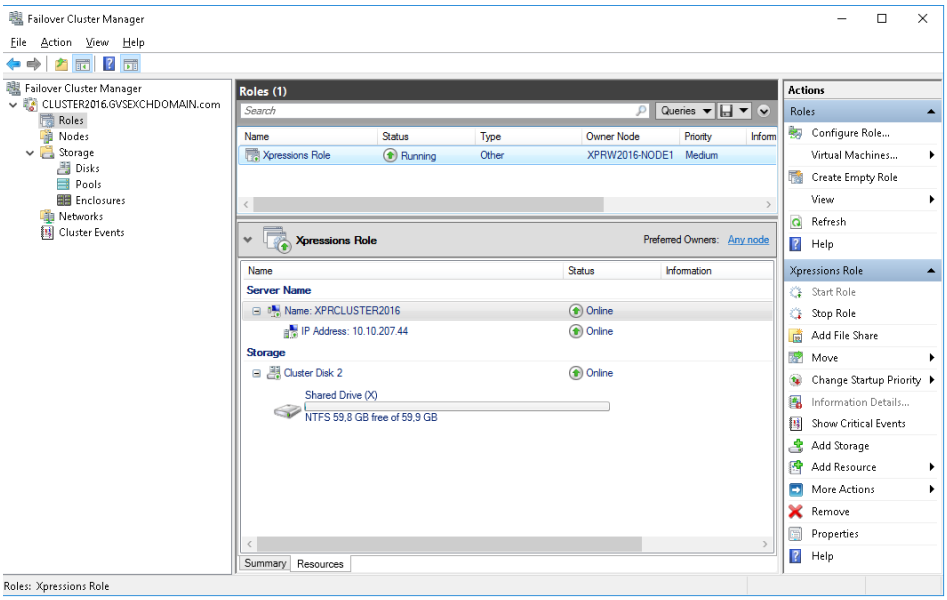
6. Go back the the Cluster Roles, right-click the Xpressions Role and select **Add Storage**.



7. Select the available disk.
8. Click on **OK**.



9. The Failover Cluster Manager now shows the created cluster disk as a Xpressios Role resource



8 XPR Installation on a Cluster System

An XPR is installed on a Windows Server 2016/2019/2022/2025 Failover Cluster analog to the steps in Chapter 4, “XPR Installation on a Cluster System”.

9 Cluster Integration

9.1 Checklist for Preparing the Cluster Installation

Step
1. Section 9.2, “Configuring the Resource XPR Information Store Res”, on page 230
2. Section 9.3, “Reassignment of the Computer Name in the Registry”, on page 231
3. Section 9.4, “Installing common System Components”, on page 235
4. Section 9.5, “Modifying Xpressions Services”, on page 242
5. Section 9.6, “Configuring local Shares as Resource”, on page 249
6. Section 9.7, “Configuring XPR Services as Resources”, on page 255
7. Section 9.8, “Replicating XPR Services as Resources to the second Node”, on page 288
8. Section 9.9, “Testing the XPR Server in the Cluster”, on page 296
9. Section 9.10, “Satellite Environment with clustered Kernel Computer”, on page 298

Table 15 Checklist for Preparing the Cluster Installation on Windows Server 2008/2012

9.2 Configuring the Resource XPR Information Store Res

1. Copy the `mrsclusres.dll` file from the `XpressionsInstall\AddOn\Misc\Cluster\x64` directory for a 64-bit operating system on the XPR setup medium into the `%WindowsInstallDir%\cluster` directory on both nodes.

   If Windows does not permit this because of the *File in use* message, stop the cluster service before copying and reboot it after copying.

2. Start PowerShell with administrator rights on the first node (active node).

   Execute the following command in it:

   ```
   Add-ClusterResourceType mrsclusres
   "C:\Windows\cluster\mrsClusRes.dll"
   ```

   This registers the resource type mrsClusRes with the cluster. Resources of this type can now be created.

3. We recommend to set the second node to **Pause** by the following substeps to prevent a possible failover.

   a) Open the Failover Cluster Manager under **start > Server Manager > Tools > Failover Cluster Manager**.

   b) Rightclick **Nodes** > **<name of the second node>** in the left-hand section.

   c) Select the **Pause** option.

9.3 Reassignment of the Computer Name in the Registry

All installation steps so far were first performed on a local system and with the server name of the local node. But because the XPR server is to be executed as cluster server, all appearances of the local-node name in the registry key folders `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Siemens` and `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM` must be replaced with the name of the virtual XPR machine.

The name of the virtual machine was created in step 3 on page 40 as network name and appears in the middle section of the Failover Cluster Manager in the category **Server Name** as **Name:<network name>**.

The state of the second node is not important.

IMPORTANT: Very important! When executing the next steps be sure to replace the computer name **only in the two mentioned registry folders `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\SIEMENS` and `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM`.**
In all other registry folders the local computer name must definitely be maintained, since otherwise the Windows operating system may not work any more. If required, create a backup copy of the registry before changing keys in it.

---

1. Start the registry editor. Click on **Start > Run**. Enter the **regedit** command in the **Open** field.

   The registry editor starts.

2. Execute the following substeps to replace the name:

   a) In the **Edit** menu click on the **Find...** option. The **Find** dialog opens.

   b) In the **Find what** field enter the computer name of the local node. Activate the options **Keys**, **Values** and **Data**. Click on **Find next**.

   The next occurrence of the computer name is displayed.

   c) If you are in the registry folder `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Siemens` or `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432\PP-COM` (see status bar), replace the local computer name with the value of <network name> in **Name:<network name>** in the category **Server Name** in the middle section of the Failover Cluster Manager.

   More changes may have to be performed in a key.

   Example:

   The key

   `HKLM\SOFTWARE\Wow6432Node\PP-COM\MRS\xmrsvc\ModuleCache`

   of type REG_MULTI_SZ has e. g. the following value:

```
XMR,
infostor,pipe://\\KERN1\pipe\MrsInfoStorIPC
mta,pipe://\\KERN1\pipe\MrsRouterIPC
...
```

Value `KERN1` must be replaced here in all positions.

More changes may have to be performed in a key. If, for example, XPR is the name of the XPR server in the cluster system, `TLCLKN1` is the name of the node in the cluster, and the key

`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\MRS Globals\Monitor Directory`

has, for example, the two-line value

```
\\XPR\MrsMonitor
\\TLCLKN1\MrsMonitor
```

, the second line must be removed without substitution.

NOTE: Do not replace the name of the local computer with the application's name.

---

d) Push key F3 to find the next appearance. In doing so be sure not to leave the above registry folders.

e) Repeat the last two substeps c and d until all appearances of the computer name of the local node have been replaced.

3. Replace the IP address that is part of the key

`HKLM\SOFTWARE\wow6432Node\PP-COM\MRS\MRS Globals\LicSvcAddress`

in the registry with the IP address of the virtual XPR server (value of <IP address> in **IP Address:<IP address>** in the category **Server Name** in the middle section of the Failover Cluster Management).

Example value for the above key:

`tcpip://172.26.209.43:13010`

4. The following key must be empty:

`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\Services\Kernel`

Remove all APL entries. Compare Section 9.10, “Satellite Environment with clustered Kernel Computer”, on page 298

5. In the registry folder

`HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\Tcpapl\NWPlugTCP`

set the value of key BindAddress to the IP address of the virtual XPR server (value of <IP address> in **IP Address:<IP address>** in the **Server Name** category in the middle section of the Failover Cluster Management).

If the **BindAdress** key does not exist, create it (type REG_SZ).

6. Check in the registry whether the following key of type REG_SZ has value MSCS (Microsoft Cluster Server):

```
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\Cluster Parameter
```

Name: Type
Type: REG_SZ
Data: MSCS

If the key does not exist yet, create it.

7. Check in the registry whether the following key of type REG_SZ has the value you assigned in step 3 from Section 7.3.1, “Creating the IP Address and Network Name as Resource” to the name of the application (example UMKernel):

```
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\PP-COM\MRS\Cluster Parameter
```

Name: Group
Type: REG_SZ
Data: <Role name>

If the key does not exist yet, create it.

8. Check that no further entries are available for the clustered kernel computer in the key HKLM/SOFTWARE/PP-COM/MRS/Services/Kernel.

Supposed, the network name of the clustered kernel computer reads XPRCL, the NameLoc,XPRCL must not be present in the following example:

```
NameLoc,XPRCL
NameLoc,SATEL1
CfgSvc,SATEL1
NameLoc,SATEL2
```

```
CfgSvc,SATEL2
```

IMPORTANT: Verify that the commas are not followed by blanks.

9. Close the registry editor and continue the XPR server installation.

9.4 Installing common System Components

9.4.1 Installing “Prerequisites“ on the Nodes

To operate the XPR server as cluster server, specific system components must be locally installed on each further node on which the installation shall be performed.

1. Connect the setup medium used to the node.
2. Search the `XpressionsInstall\Prerequisites\` directory on the setup medium for the following files:

   a) `vcruntimeinst.exe`

   b) `vcredist_x86.exe`

   c) `vcredist_x64.exe`

   d) `vc9\vcredist_x86.exe`

   e) `vc10\vcredist_x86.exe`
3. Start these files on the node.

   NOTE: No dialog window will be displayed announcing the end of the execution of this file.
4. Repeat the previous steps 1 on page 235 to 3 on page 235 on each node on which the XPR server is to operate in the cluster.

9.4.2 Installing Printer Drivers on the Nodes

Another system component to be locally installed are the XPR printer drivers. They must also be installed on all further nodes on which the XPR server is executed in the cluster. A cluster enables installing a printer driver on the cluster by creating a cluster resource called “Print Spooler”. This cluster resource must not be created and used.

NOTE: The installation of the printer driver requires a computer reboot. Verify that no critical applications have been started on the computer respectively can be rebooted.

Proceed as follows:

1. Connect the setup medium to the node and start the setup.exe file in the following directory on the setup medium:

   `XpressionsInstall\AddOn\Misc\Cluster\x64\`

   NOTE: Start under **Windows Server 2008/2012 R2 64 bit** the setup.exe file in the following directory:
   `XpressionsInstall\AddOn\Misc\Cluster\x64\`

2. Click on **Next**.
3. Read the license conditions, activate the **I accept the terms in the License Agreement** checkbox and click on **Next**.
4. Click on **Install**. Setup is performed and you can see the progress in a dialog.
5. Click on **Finish** to complete the installation.
6. Restart the computer.
7. Open the file `C:\WINDOWS\Temp\ucsetup.log`. In this file you find log entries that indicate whether the printer driver was duly installed.
8. Perform the steps 1 to 7 on each node.

9.4.2.1 Uninstalling the Printer Driver

How to uninstall the printer driver from the system at a later date:

1. Connect the setup medium to the node and start the setup.exe file in the following directory on the setup medium:

   `XpressionsInstall\AddOn\Misc\Cluster`

2. Click on **Next**.
3. Click on **Remove**.
4. Click on **Remove**. The uninstallation starts.
5. Click on **Finish**.
6. Perform the steps 1 to 5 on each node.

9.4.3 Installing Printer Embedded Codes

Execute the following steps to install Printer Embedded Codes:

1. Create a new directory on the cluster drive, for example `R:\pec_spool`.
2. Executing the following sub-steps, grant every user full access to this directory to enable the XPR server to access the PostScript files.

   a) In the Windows Explorer, click this directory with the right mouse button and select the **Properties** menu option.

   b) Click on the **Sharing** tab.

   c) Click on the **Advanced Sharing...** button.

   d) Activate the **Share this folder** check box.

   e) Click on the **Permissions** button.

   f) Select the **Everyone** entry in the **Group or user names** field.

   g) Activate in the **Permissions for "Everyone"** field the **Allow** check box for the **Full Control** entry.

   h) Click on **OK**.

   i) Click on **OK**.

   j) Click on **Close**.

   You can open the shared folder in the Windows Explorer running on another computer in the network e. g. as follows:

   ```
   \\<IP address of the virtual server>\pec_spool
   ```

   IMPORTANT: Replace `<IP address of the virtual server>` with the IP address of the virtual server but **not** with one of the following values (see the note in Section 6.1.2, "Client Access Point (Virtual Server)", on page 194):
   - Cluster IP address
   - IP address of one of the two nodes to the client network
   - IP address of one of the two nodes for the internal cluster connection (Interconnect)
   - Network name of one of the two nodes

3. Now execute step 1 on page 249 to step 9 on page 251 in Section 9.6.1, "Setting the Share Resource Privileges of the XPR Server on Windows Server 2008/2012", on page 249 with the values in the following table:

Share name	Path	User group	Privileges
<Name>	[LW:]\pec_spool	Everyone	Full control

Replace <Name> with any value.

NOTE: The instructions in Section 9.6.1, “Setting the Share Resource Privileges of the XPR Server on Windows Server 2008/2012”, on page 249 will later (not now!) be executed with the values in Table 16 on page 249.

---

4. On every client computer to use these Printer Embedded Codes you must install a specific **local** printer by executing the following sub-steps.

NOTE: Depending on the operating system used, these sub-steps may vary.

---

a) Open **Start** > **Devices and Printers**.

b) Click on the **Add a printer** menu option.

c) Click on the **Add a local printer** button.

d) Select value **XPR Server Fax Monitor** in the **Use an existing port** field.

e) Click on **Next**.

f) If you install the printer on Windows 7, Windows Server 2008 or Windows Server 2008 R2, select printer **HP LaserJet 2300 Series PS**.

If you install the printer on Windows Server 2012 or Windows Server 2016, 2019, 2022, 2025 select printer **HP Universal Printer Driver**. You can download the printer driver from `ftp://ftp.hp.com/pub/softlib/software12/COL40842/ds-99376-4/upd-ps-x64-5.6.0.14430.exe`, for example.

g) Click on **Next**.

h) Enter a name ending in `EC` (for example `XPR EC`) for the printer.

IMPORTANT: The `EC` in the printer name must be preceded by a blank (see above example).

---

i) Click on **Next**.

j) Activate the check box **Do not share this printer** and click on **Next**.

IMPORTANT: Following the instructions, configure the printer **at any rate** as local printer (do **NOT** share this printer).

---

k) Click on **Finish**.

l) Click the printer with the right mouse button and select **Printing Preferences**.

NOTE: Depending on the operating system you need to select **Properties** > **General** > **Printing Preferences**.

---

m) Click on the **Advanced** tab.

n) Set **Document Options** > **PostScript Options** > **PostScript Output Options** to value **Optimize for Portability**.

o) Click on **OK**.

IMPORTANT: You must use a Courier font to make embedded codes legible for the Mail APL.
If you use other fonts, the printer driver writes texts as binary code in the created PostScript file and the Mail APL cannot read the embedded codes anymore.

---

5. Executing the following sub-steps, you must set values in the registry on each **client computer** to use these Printer Embedded Codes for the newly configured printer to know where the XPR and the shared directory is found.

NOTE: Execute such sub-steps **neither** on the active **nor** on the inactive node!

---

a) Open **Start** > **Run**.

b) Enter `regedit` and click on **OK**.

c) Open the key [1] `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\FaxMon\DefaultDir`.

If this key does not exist yet, create it (type REG_SZ).

d) Enter as value of this key the UNC path of the directory you shared in step 2 on page 237 on the cluster.

Example:

1. Use on 64-bit operating systems `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\...` instead of `HKEY_LOCAL_MACHINE\SOFTWARE\...`.

e) `\\<IP address of the virtual server>\pec_spool`

IMPORTANT: Replace `<IP address of the virtual server>` with the IP address of the virtual server but **not** with one of the following values (see the note in Section 2.1.2, “Client Access Point (Virtual Server)”, on page 18):
- Cluster IP address
- IP address of one of the two nodes to the client network
- IP address of one of the two nodes for the internal cluster connection (Interconnect)
- Network name of one of the two nodes

---

f) Open the key[1] `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\FaxMon\MailApl_FaxPipe_Host`.

If this key does not exist yet, create it (type REG_SZ).

g) Enter as value of this key the IP address or the network name of the virtual server.

IMPORTANT: Enter **none** of the following values (see note in Section 2.1.2, “Client Access Point (Virtual Server)”, on page 18):
- Cluster IP address
- IP address of one of the two nodes towards the client network
- IP address of one of the two nodes for the internal cluster connection (Interconnect)
- Network name of one of the two nodes

---

6. Set the following registry key[1] to value `0x00000001`:

   `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MailApl\SupportEC`

   If the key does not exist, create it (type REG_DWORD).

   The Mail APL evaluates the embedded codes in the print output of the PostScript code and replaces them with blanks in the hardcopy.

7. Set the following key[1] in the registry **of the active node** to value `0x00000001`:

   `HKEY_LOCAL_MACHINE\SOFTWARE\PP-COM\MRS\MailApl\SupportEC`

   If the key does not exist, create it (type REG_DWORD).

1. Use on 64-bit operating systems `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\...` instead of `HKEY_LOCAL_MACHINE\SOFTWARE\...`.

9.4.4 Setting System Variables on the Nodes

The system variables Path and two system variables for Ghostscript must be extended respectively set on all further nodes on which the XPR server is executed in the cluster.

1. Click on **Start > Control Panel**.
2. Click on the **System and Security** entry.
3. Click on the link **Advanced system settings**.
4. Click on the **Environment Variables** button.
5. Extending the Path System Variables
   a) Doubleclick the entry of the **Path** variable in the **System variables** section.

   IMPORTANT: Verify that you modify the **Path** variable in the **System variables** section and not in the **User variables** section.

   b) Place the cursor at the end of the **Variable value** field.
   c) Insert a semicolon.
   d) Enter a value analog to the following path:

   `R:\OpenScape\XPR\bin;r:\OpenScape\XPR\SDKTools`.

   In this path, `R:\OpenScape\XPR\` is the directory of the XPR on the cluster drive (see step 4 on page 49).
   e) Click on **OK**.
6. Setting the system variables for Ghostscript:

   Ghostscript should no longer be used.

   In order to avoid any vulnerabilities or any conversion issues using Ghostscript, please delete the contents from `res\convert\ghostscript` folder and use the **DisableGS** registry key as documented on section E.1.3 of the Server Administration manual
7. Perform the steps 1 to 6 on each node.

9.5 Modifying Xpressions Services

Before you can perform the cluster integration, all XPR services must be stopped on the node on which the XPR installation was performed.

IMPORTANT: The application for the XPR server must not have been shifted between the nodes at this point.

9.5.1 Setting Xpressions Services to manual

1. Click on **Start > Windows > Administrative Tools > Services**.

   The service management opens.

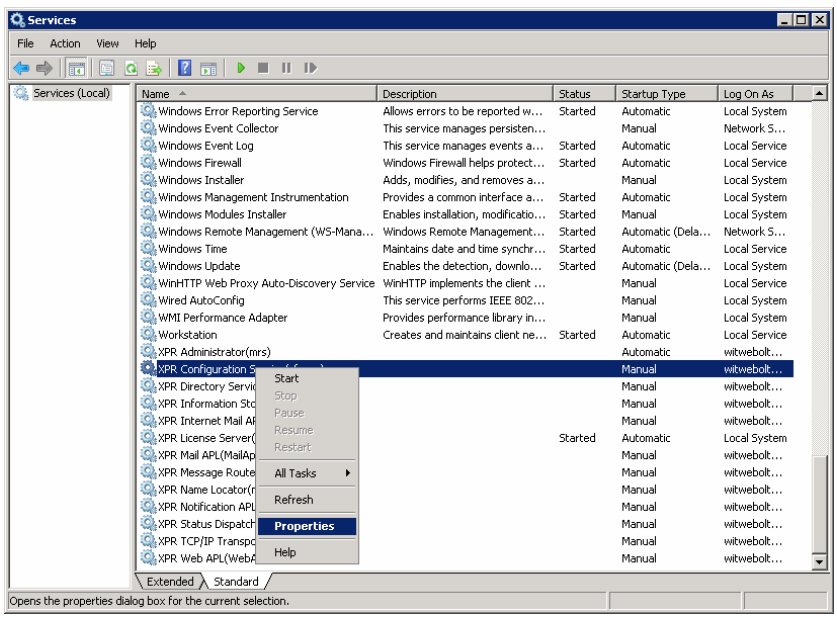
2. Find the following services:

   - XPR Administrator (mrs)
   - XPR License Server(licsvc)
   - stunnel

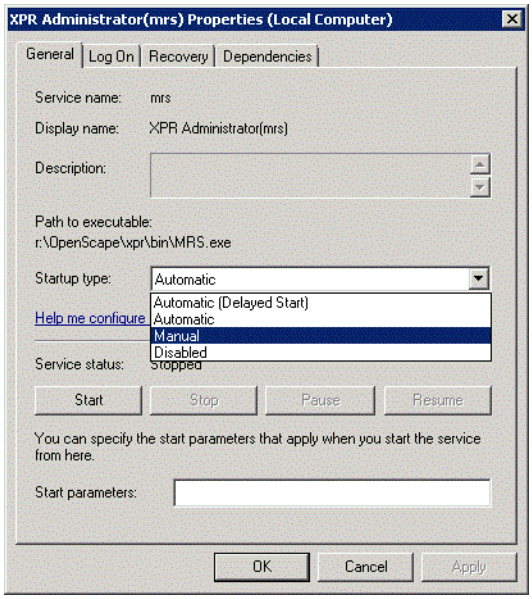
3. Click with the right mouse button on the service XPR Administrator(mrs) and select **Stop** from the context menu.

4. Set the service to manual start.

   a) Click with the right mouse button on the service and select **Properties** from the context menu.



The **Properties** dialog opens:



b) In the **Startup type** field select the **Manual** option.

c) Click on the **OK** button to close the dialog

Alternatively you can use also the following commands in PowerShell:

Set-Service <service name> -StartUpType "manual"

- Use “**mrs**” on service name parameter for **XPR Administrator (mrs)**
- Use “**licsvc**” on service name parameter for **XPR License Server(licsvc)**
- Use “**stunnel**” on service name parameter for **stunnel**

5. Repeat steps 4a to 4c for the services XPR License Server(licsvc) and stunnel.

9.5.2 Assigning a Login Account for XPR Services

Check whether the following conditions have been met:

1. A login account for the XPR services has been created (see Section 4.3.2, “Creating a Login Account for XPR Services”, on page 76).
2. In step 1 on page 97 the **Assign an account to Xpressions services** check box has been activated.
3. You do not want to install a Microsoft Exchange server on the cluster.

If all of these conditions have been met, check in the service management whether for all XPR services the **Log On As** column displays the user name you desire and skip all further instructions in this section.

If only conditions 1 and 2 have been met, you need to execute the following instructions of this section only for the Exchange services. In doing so, you need to enter a special user account (see below and the installation and administrator documentation *OpenScape Xpressions Microsoft Exchange Gateway*).

If conditions 1 and 2 have not been met, execute the following instructions of this section.

So that the required XPR services can be operated in the cluster context, they must be started with a user account that exists on all nodes of the cluster and gives identical privileges. This account must be created by the local network administrator and furnished with the required privileges.

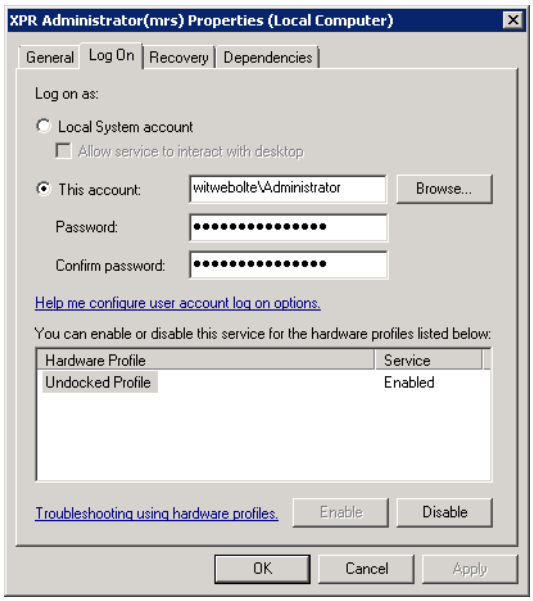
The user account created for executing the services must at least fulfill the following conditions:

- The user must be a domain user and belong to the same domain in which the XPR server is installed.
- All services and APLs that operate under this user must receive the privilege *Logon as Service*.
- The user must be available on all nodes on which the XPR server is installed.

IMPORTANT: If you also install the services **XPR Exchange Connector for i386 (<XPR server name>:<Exchange server name>)** or **XPR Exchange UM APL** in the cluster, a user account with further special privileges must be used for these services instead of the above one. The setup and administrator documentation *OpenScape Xpressions Microsoft Exchange Gateway* delivers comprehensive details on the required privileges under the term **Service Account**. Please keep in mind that setting up the Exchange connection requires more privileges than operating it.

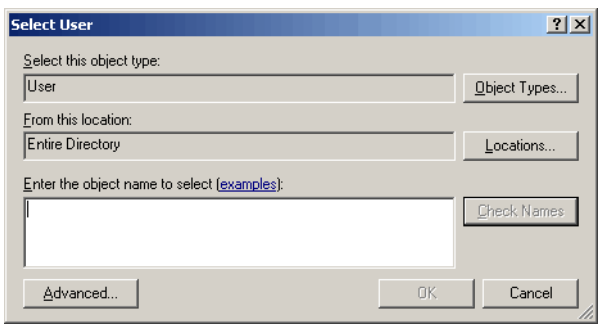
---

1. Open the service management. To do this, click on **Start > Windows > Administrative Tools > Services**.
2. Verify that all XPR services are disabled (offline) (cf. Section 9.5, “Modifying Xpressions Services”, on page 242).
3. Click with the right mouse button on the first available XPR service, for example XPR Administrator(mrs). In the context menu select the **Properties** option and then switch to the **Log On** tab.



4. Select the option **This account**.
5. Click on the **Browse...** button to look for the XPR services user account defaulted by the network administrator.

   The **Select User** dialog opens.



   a) In the **Object Types...** list select the *User* object type.

   b) Click on the **Locations...** button to use either a local user account or a user account from a domain.

   c) In the **Locations** window select the appropriate computer or the corresponding domain.

   d) Click on the **OK** button to return to the **Select User** dialog.

   e) Click on the **Check Names** button to look for user accounts.

   f) In the **Enter the object name to select** field enter the beginning of the user name.

   g) Click on the **Check Names** button.

      The bottom list displays the user accounts found.

h) Select the user account defaulted by the network administrator for the XPR services in the **Enter the object name to select** field and click on **OK**.

IMPORTANT: If you execute this step for the services **XPR Exchange Connector for i386 (<XPR server name>:<Exchange server name>)** or **XPR Exchange UM APL**, please heed the above special requirements on the privileges of this account.

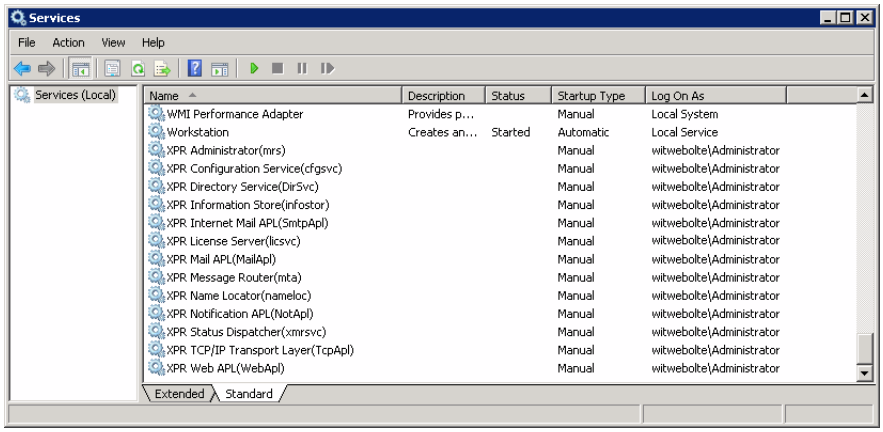
---

6. The **Log On** tab displays the selected user. In the **Password** and **Confirm password** fields enter the password for this user account.
7. Click on **OK** to copy the settings.

   Alternatively you can use the following command in PowerShell:

   ```
   (GWmi Win32_Service -Filter <service
   name>).Change($null,$null,$null,$null,$null,$null,"<user
   @domain.com>","<password>",$null,$null,<dependency
   service>)
   ```

   - On **<dependency service>** parameter you can set it to $null as it is described on Section 9.5.3, "Removing Xpressions Service Dependencies"
8. Repeat steps 1 on page 244 to 7 on page 246 for each further XPR server service.



9.5.3 Removing Xpressions Service Dependencies

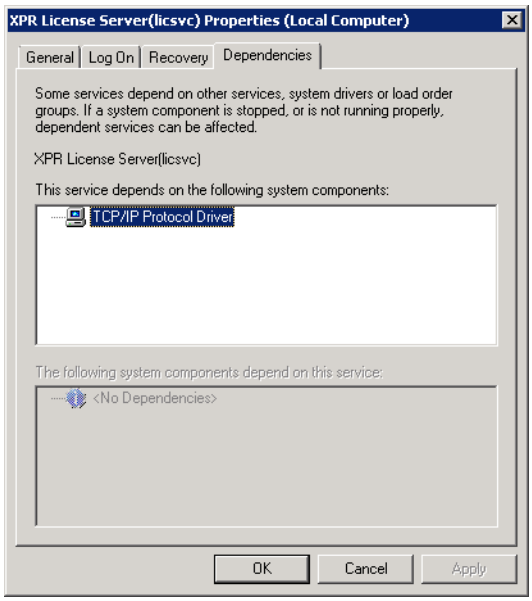
The dependencies between the XPR services created by the XPR setup must be deleted by the following steps:

1. Open the service management under **start > Windows > Administrative Tools > Services**.

   a) Rightclick an XPR service and select **Properties**.

   b) Click on the **Dependencies** tab.

   The first field displays the services the selected service depends on.



2. Click on **Cancel >**.

3. Open a command prompt and enter the command as follows:

   ```
   sc config <service name> depend= /
   ```

   IMPORTANT: Please note that a blank must follow the equals sign.

   Example:

   ```
   sc config licsvc depend= /
   ```

   Example output of a successful performance:

   ```
   C:\Users\administrator.WITWEBOLTE>sc config licsvc depend= /
   [SC] ChangeServiceConfig SUCCESS
   C:\Users\administrator.WITWEBOLTE>
   ```

   IMPORTANT: Be sure **not** to enter a command according to the following pattern:
   `sc config <service name> depend= \`
   The consequence of this wrong command would be that the resource to be created for this service could not be brought online (see step 21 on page 275). Even in case of this wrong command the described message of successful

execution is issued.

Alternatively you can use the following command in PowerShell:

```
(GWmi Win32_Service -Filter
<ServiceName>).Change($null,$null,$null,$null,$null,$nul
l,"<user@domain.com>","<password>",$null,$null,<dependen
cy service>)
```

- On **<dependency service>** you need to set it to $null
- **<user@domain.com>** and **<password>** parameters values are described on Section 9.5.2, "Assigning a Login Account for XPR Services"
- <ServiceName> is the Xpressions service name

4. You can check the dependencies of this service by repeating step 1 on page 247. No services are displayed on the **Dependencies** tab.
5. Execute step 3 for all XPR services displayed in the service management. The sequence of this execution is irrelevant. You find the names of these services in the **Service name** column of Table 17 on page 257.
6. Close the command prompt.

9.6 Configuring local Shares as Resource

9.6.1 Setting the Privileges of the XPR Server Shares in the Cluster

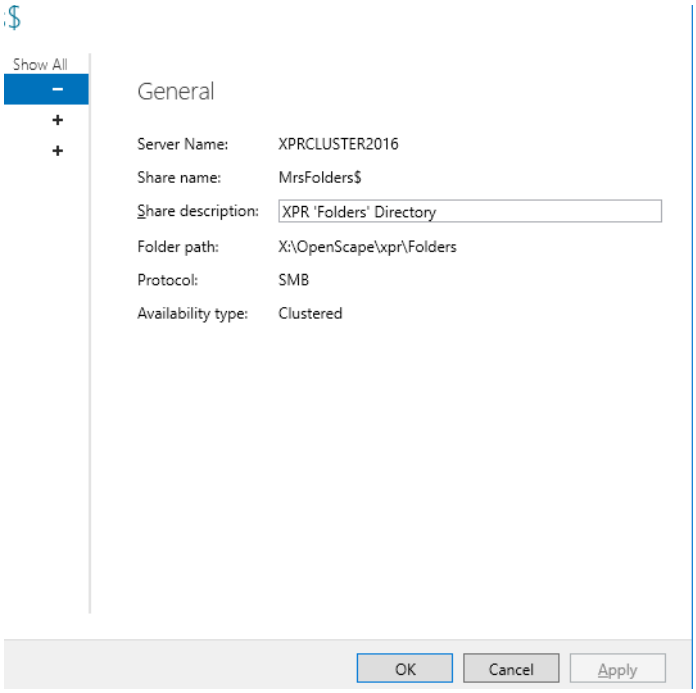
During the installation, several shares were configured for the XPR server. The privileges of the MrsBackup$ share are set in the following steps. Repeat these steps for each further XPR share according to the following table:

XPR Directory	Share name	Path	User group	Privileges
Backup	MrsBackup$	[LW:]\path\backup	Local Administrators	Full control
Client	MrsClnt	[LW:]\path\client	Everyone	Read
Folders	MrsFolders$	[LW:]\path\folders	Local Administrators	Full control
Monitor	MrsMonitor	[LW:]\path\monitor	Local Administrators	Read
NCO	MrsNCOConfig$	[LW:]\path\NCO	Local Administrators	Full control
Userdata	MrsUserdata$	[LW:]\path\userdata	Local Administrators	Full control

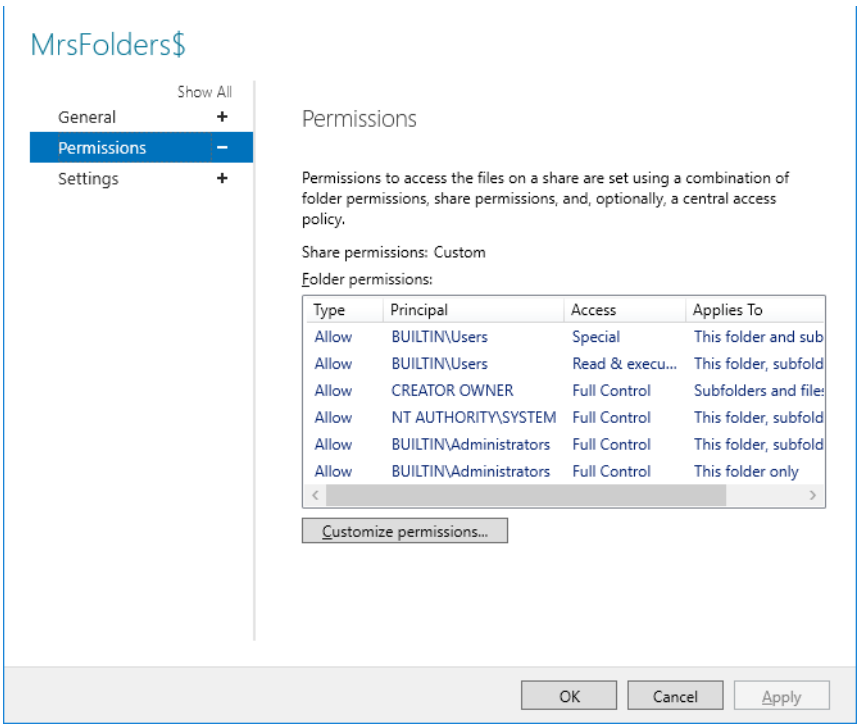
Table 16 Setting the Share Resource Privileges of the XPR Server on Windows Server 2008/2012

1. Open **Start > Windows > Administrative Tools > Failover Cluster Manager**.
2. Select the Shares tab and right-click the MrsBackup$ entry in the Shared Folders section.

3. Select **Properties...**.

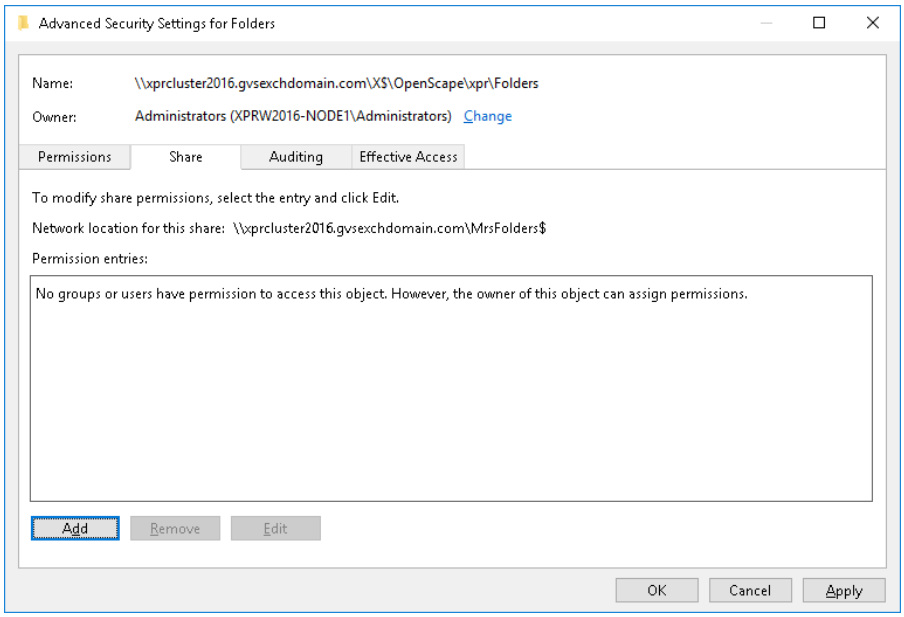


4. Click on the **Permissions...** tab.



5. Click on the **Customize Permissions...** button.

6. The **Advanded Security Settings for <share name>** dialog opens.
7. Click on **Share** tab.



   a) Select user or group names probably already available in the **Group or user names** list.

   b) Click on the **Remove** button to delete the already available user names.

   c) Click on the **Add** button to add a new or existing user to the list. The user for the shares is specified by the network administrator.

   d) Create the user as member of the group specified by Table 16 on page 249.

   e) Assign the privileges to the user according to Table 16 on page 249.

8. Click on **OK**.
9. Click on **OK** to return to the Failover Cluster Manager.
10. Repeat steps 2 on page 249 to 9 on page 251 for each further share according to Table 16 on page 249.

    Alternatively you can use the following commands in PowerShell:

    To get a list of your local shares:

    ```
    Get-SmbShare
    ```

    To remove a share in order to recreate them with the correct user rights, run:

    ```
    Remove-SmbShare -Name <Share Name>
    ```

    e.g.

    ```
    Remove-SmbShare -Name MrsBackup$
    ```

To create the Xpressions shares with the correct user rights:

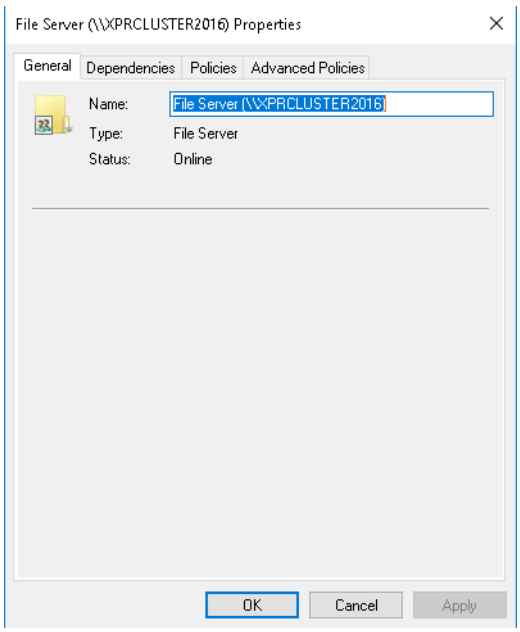
```
New-SmbShare -Name MrsBackup$ -Path "<XPR Install
Directory>\Backup" -FullAccess "Administrators" -
Description "XPR 'Backup' Directory"

New-SmbShare -Name MrsClnt -Path "<XPR Install
Directory>\Client" -ReadAccess Everyone -Description "XPR
'Client' Directory"

New-SmbShare -Name MrsFolders$ -Path "<XPR Install
Directory>\Folders" -FullAccess "Administrators" -
Description "XPR 'Folders' Directory"

New-SmbShare -Name MrsMonitor -Path "<XPR Install
Directory>\Monitor" -ReadAccess "Administrators" -
Description "XPR 'Monitor' Directory"

New-SmbShare -Name MrsNCOConfig$ -Path "<XPR Install
Directory>\NCO" -FullAccess "Administrators" -
Description "XPR 'NCO Configuration' Directory"

New-SmbShare -Name MrsUserdata$ -Path "<XPR Install
Directory>\Userdata" - FullAccess "Administrators" -
Description "XPR 'Userdata' Directory"
```

- On **<Network User>** parameter you need to set it to "**Administrators**"
- On **<XPR Install Directory>** parameter you need to use the Xpressions installation path e.g. "`R:\OpenScape\xpr`"

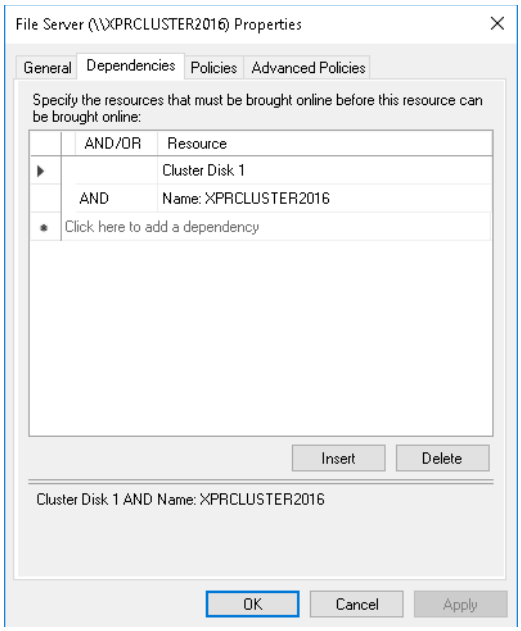
9.6.2 Configuring the Resource File Server Res

The middle section of the Failover Cluster Manager displays the resource created by the XPR setup named **FileServer (\\<Network Name>)** of type **File Server**. This resource represents the totality of all created shares, which are displayed in detail in the Failover Cluster Manager further down below under **Shared** tab. This resource must be configured via the following steps.

1. Rightclick the resource **FileServer (\\<Network Name>)** and select **Properties**.

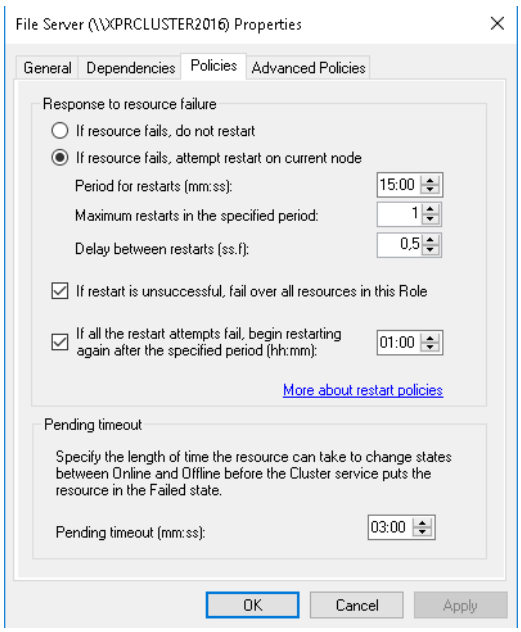


2. Click on the **Dependencies** tab.



3. Verify that this resource depends on the resource of type **Network Name** and on the **Cluster Disk**.

4. Click on the **Policies** tab.



5. Perform the settings according to the description in Section 6.1.9, “Failover and Failback”, on page 199.

6. Click on **OK**.

9.7 Configuring XPR Services as Resources

9.7.1 Overview

All XPR services that were configured in the cluster as services during the XPR server setup (see Chapter 4, “XPR Installation on a Cluster System”) were configured as local services on the first node.

You have determined the XPR services to be installed as local services on the first node by selecting the features to be installed in Section 4.4.1, “Selecting Features”, on page 95 (see also Table 4-2 on page 96). All other required XPR services must be installed on a satellite (see Section 9.10, “Satellite Environment with clustered Kernel Computer”, on page 298).

The services installed as local services on the first node must be configured as resources for operating as services in the cluster, thus being automatically transmitted to the second node in case of a failover. XPR services to operate on a satellite are not configured as resources.

All XPR services in the below Table 17 on page 257 can principally be installed in the cluster. The **Installation in the cluster** column indicates whether an XPR service has to be (value: Mandatory) or can be (value: Optional) installed in the cluster. Only for XPR services listed in this table you were allowed to select the corresponding features listed in Table 4-2 on page 96 during the installation.

The instructions listed in Section 9.7.2, “Procedure”, on page 262 in step 1 on page 262 to step 21 on page 275 exemplify the configuration of the license service (licsvc) as resource. Subsequently, you need to perform the same procedure for every further mandatory service, except for XPR Information Store, with the corresponding values according to Table 17 on page 257 in the specified order (see step 22 on page 275. The analog process for the XPR Information Store is described in Section 9.7.3, “Creating the Resource XPR Information Store Res”, on page 278.

After you have configured the mandatory XPR services as resources you need to configure the optional XPR services as resource (see step 23 on page 275), provided they have been installed on your XPR server. The sequence in which you configure the optional XPR services as resources is irrelevant. Therefore they all have the same consecutive number in the table. Please use the service management to learn which of these XPR services are available on your XPR server.

IMPORTANT: The **Availability** column in Table 17 on page 257 indicates whether a service in a cluster is generally available (GA) or only limited (LA).

Limited availability means that this XPR service depends on third-party software or contains such software, which has not been released by the producer for

Windows cluster. We have, however, verified that the corresponding XPR component can operate on a Windows cluster. If a change or bug in the third-party software leads to an XPR incompatibility in a Windows cluster, Unify Software and Solutions GmbH & Co. KG will attempt to provide a workaround. If such a workaround is not economically justifiable, this problem may be finally solved by performing the XPR cluster installation once more and in a way that this component is moved to a (not clustered) satellite.

IMPORTANT: The XPR Reporting APL (RepApl) and the XPR Schedule APL (RepScheduleApl) should be installed on satellite(s). In case of setting up the XPR Reporting APL or the XPR Reporting Schedule APL on a satellite, the XPR must be connected to a Microsoft SQL server found on a computer outside the cluster. Please heed the notes in Section A.1, “Using a Microsoft SQL Server”, on page 303.

Sequence	Service name in the service management	Service name	Installation in the cluster	[1]Availability	Dependencies	HKLM registry keys to be entered in the registry replication dialog	Feature selection during the XPR installation
1	XPR License Service (licsvc)	licsvc	Mandatory	GA	File Server Resource (see Section 9.6.2, “Configuring the Resource File Server Res”, on page 253)	Use on 64-bit operating systems `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\...` instead of `HKEY_LOCAL_MACHINE\SOFTWARE\...` • SOFTWARE\PP-COM • SOFTWARE\SIEMENS • SYSTEM\CurrentControlSet\Services\licsvc If you use the system networking (ISC) in the cluster, the following keys must be entered as well: • HKLM\SOFTWARE\Wow6432Node\classes\CLSID\{C49A8D40-9047-49c4-88DD-637833875D7D} • HKLM\SOFTWARE\Wow6432Node\classes\CLSID\{93219EF7-2D4C-4d65-9A4A-8D1AC0F6790A}	
2	XPR Name Locator (nameloc)	NameLoc	Mandatory	GA	licsvc	SYSTEM\CurrentControlSet\Services\nameloc	
3	XPR Configuration Service (cfgsvc)	cfgsvc	Mandatory	GA	NameLoc	SYSTEM\CurrentControlSet\Services\cfgsvc	
4	XPR Status Dispatcher (xmrsvc)	xmrsvc	Mandatory	GA	cfgsvc	SYSTEM\CurrentControlSet\Services\xmrsvc	

Table 17 Services to be installed as Resources on Windows Server 2008/2012

Sequence	Service name in the service management	Service name	Installation in the cluster	[1]Availability	Dependencies	HKLM registry keys to be entered in the registry replication dialog	Feature selection during the XPR installation
5	XPR Information Store (infostor) **IMPORTANT**: The XPR Information Store is **not** configured as resource like the other services! **Do not** follow the instructions given in Section 9.7.2, “Procedure”, on page 262 but those provided in Section 9.7.3, “Creating the Resource XPR Information Store Res”, on page 278!	Infostor	Mandatory	GA	xmrsvc Network name Drive on which the Infostor files are found		
6	XPR Message Router (mta)	mta	Mandatory	GA	Infostor	SYSTEM\CurrentControlSet\Services\mta	
7	XPR Administrator (mrs)	mrs	Mandatory	GA	mta	SYSTEM\CurrentControlSet\Services\mrs	
8	XPR TCP/IP Transport Layer(tcpApl)	tcpapl	Mandatory	GA	mrs	SYSTEM\CurrentControlSet\Services\TcpApl	TCP/IP support
9	stunnel	stunnel	Mandatory	GA	tcpapl	SYSTEM\CurrentControlSet\Services\stunnel	See step 6 on page 113
10	XPR Directory Service (DirSvc)	DirSvc	Mandatory	GA	mrs	SYSTEM\CurrentControlSet\Services\DirSvc	
11	XPR Internet Mail APL (SmtpApl)	SMTPAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\SmtpApl	Internet e-mail server
11	XPR Vm2Txt APL(Vm2TxtApl)	Vm2TxtApl	Optional	LA	Network with internet access	SYSTEM\CurrentControlSet\Services\Vm2TxtAp	“Speech to Text”
11	XPR Web APL (WebApl)	WEBAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\WebApl	Webserver
11	XPR Mail APL (MailApl)	MailApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\MailApl	
11	XPR Lear APL (Lear)	Lear	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\Lear	’Lear’ test module
11	XPR Notification APL (NotApl)	NotApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\NotApl	Notification module

Table 17 Services to be installed as Resources on Windows Server 2008/2012

Sequence	Service name in the service management	Service name	Installation in the cluster	[1]Availability	Dependencies	HKLM registry keys to be entered in the registry replication dialog	Feature selection during the XPR installation
11	XPR Lpr APL (LprApl)	LprApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\LprApl	Print output management
11	XPR Csta Apl (CstaApl)	CSTAAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\CstaApl	CSTA protocol
11	XPR Cti APL(CtiApl) Note: With CSTA connection	CTIAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\CtiApl	CTI Computer Telephony Integration
11	XPR ip APL (ipApl) Note: Without TTS and without ASR	IPAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\ipApl	IP telephony
11	XPR Ldap APL (LdapApl)	LDAPAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\LdapApl	LDAP directory synchronization
11	XPR Presence APL (PresenceApl)	PRESENCE APL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\PresenceApl	Presence APL
11	XPR Xml APL (XmlApl)	XmlApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\XmlApl	Web Service Provider
11	XPR VM APL (VMApl)	VMApl	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\VMApl	Virtual Machine (VM)
11	XPR Printer APL (PrintApl)	PrintAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\PrintApl	Print module
11	XPR Cti APL(CtiApl) Note: With TAPI connection	CTIAPL	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\CtiApl	CTI Computer Telephony Integration
11	XPR Isdn APL (IsdnApl) Note: Without TTS and without ASR	IsdnApl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\IsdnApl	ISDN hardware
11	XPR SMS Large Account APL (SmsIPApl)	SmsIPApl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\SmsIPApl	Short Message Service
11	XPR Serial APL (V24Apl)	V24Apl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\V24Apl	V.24 support
11	XPR FileInterface APL (FiApl)	File interface	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\FiApl	File interface

Table 17 Services to be installed as Resources on Windows Server 2008/2012

Sequence	Service name in the service management	Service name	Installation in the cluster	[1]Availability	Dependencies	HKLM registry keys to be entered in the registry replication dialog	Feature selection during the XPR installation
11	XPR Exchange Connector for i386 (<XPR server name>:<Exchange 2003 server name>)	<XPR server name>:<Exchange 2003 server name>	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\ExchApl	MS Exchange 2003 Connector
11	XPR Exchange Connector for i386 (<XPR server name>:<Exchange 2007 server name>)	<XPR server name>:<Exchange 2007 server name>	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\ExchApl	MS Exchange 2007 Connector
11	XPR Exchange UM APL	ExUmApl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\ExUmApl	MS Exchange TUM Connector
11	XPR Lotus Notes APL (LNApl)	LNAPL	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\LnApl	Lotus Notes Gateway
11	XPR Lotus Notes UM APL (LnUmApl)	LnUmAPL	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\LnUmApl	Lotus Notes TUM
11	XPR SAP R/3 APL (SapR3Apl)	SapR3Apl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\SapR3Apl	SAPconnect
	IMPORTANT: Setting up this APL on a Windows cluster **has been released only project-specifically**.						
11	XPR SAPphone APL(SAPphoneApl)	SAPphoneApl	Optional	LA	mrs	SYSTEM\CurrentControlSet\Services\SAPphoneApl	SAPphone (CTI)
	IMPORTANT: Setting up this APL on a Windows cluster **has been released only project-specifically**.						
11	XPR Connection Apl (ConApl)	CONAPL	Optional	GA	mrs	SYSTEM\CurrentControlSet\Services\ConApl	Connection Apl

Table 17 Services to be installed as Resources on Windows Server 2008/2012

1 GA: General Availability), LA: Limited Availability

You cannot install the following XPR services on a Windows cluster:

Service name in the service management	Service name	Feature selection during the installation
XPR Connection APL (conapl) with web conferencing, voice conferencing and OpenScape Web Client	CONAPL	Connection APL
XPR Isdn APL (IsdnApl) Note: With TTS and/or ASR	IsdnApl	ISDN hardware
XPR ip APL (ipApl) Note: With TTS and/or ASR	IPAPL	IP telephony
XPR Db APL (DbApl)	DBAPL	Database connection module
XPRSAP Business Routing APL (SAPROUTEAPL)	SAPROUTEAPL	SapConnect: routing
XPR HiPath Management APL (HpmApl)	HPMAPL	User administration with HPM-UM
XPR ABC APL (AbcApl)	ABCAPL	Alcatel 4400 ABCA protocol
XPR Wall Display APL (WallApl)	WALLAPL	Wall display module

Table 18 XPR *Services that cannot be installed on a Cluster on Windows 2008/2012*

9.7.2 Procedure

How to configure a service as XPR resource:

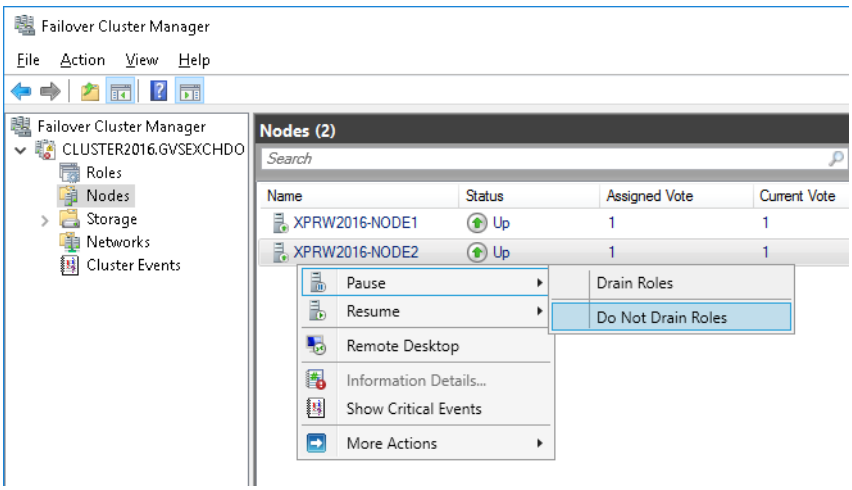
IMPORTANT: Verify that in the service management the corresponding user name is contained in the **Log On As** column, all relevant XPR services are stopped and the **Startup Type** is set to Manual.

Creating the resource

1. We recommend to set the second node to **Pause** by the following substeps to prevent a possible failover.

   a) Open the Failover Cluster Manager under **start > Windows > Administrative Tools > Failover Cluster Manager**.

   b) Rightclick **Nodes** > **<name of the second node>** in the left-hand section.



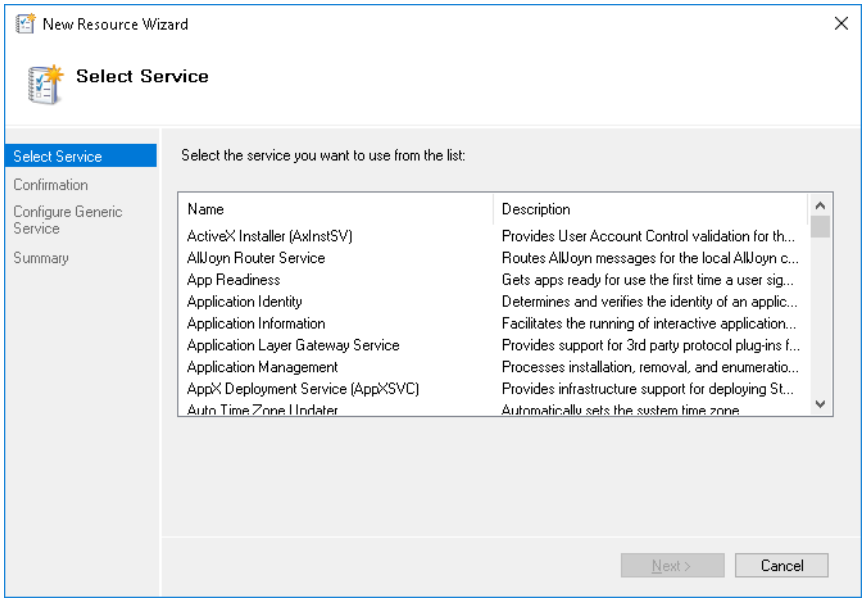
   c) Select the **Pause Do Not Drain Roles** option.

2. Verify that the application for the XPR server is online.

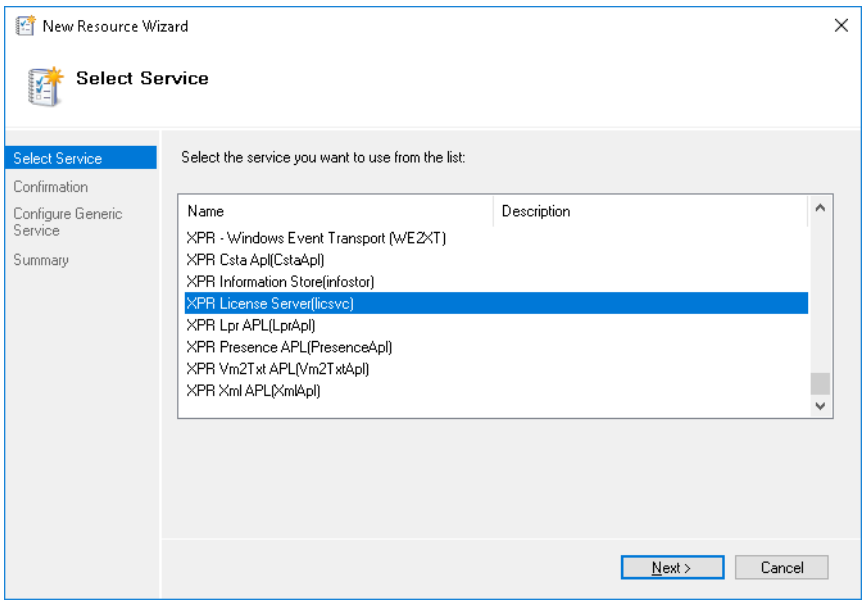
3. In the Failover Cluster Manager, right-click the Xpressions Role on **Roles**.

4. Select **Add a resource > 4 - Generic Service** in the context menu

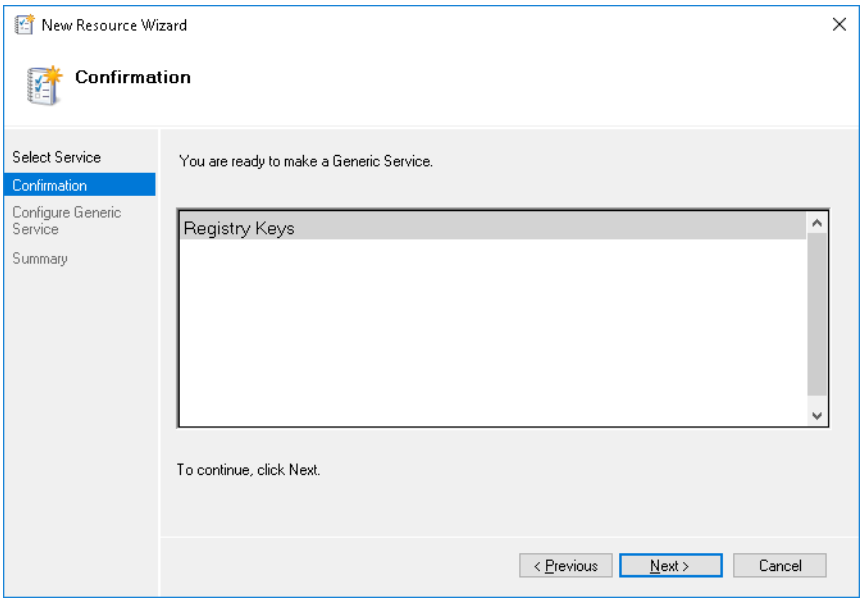
   The **New Resource Wizard** dialog opens.



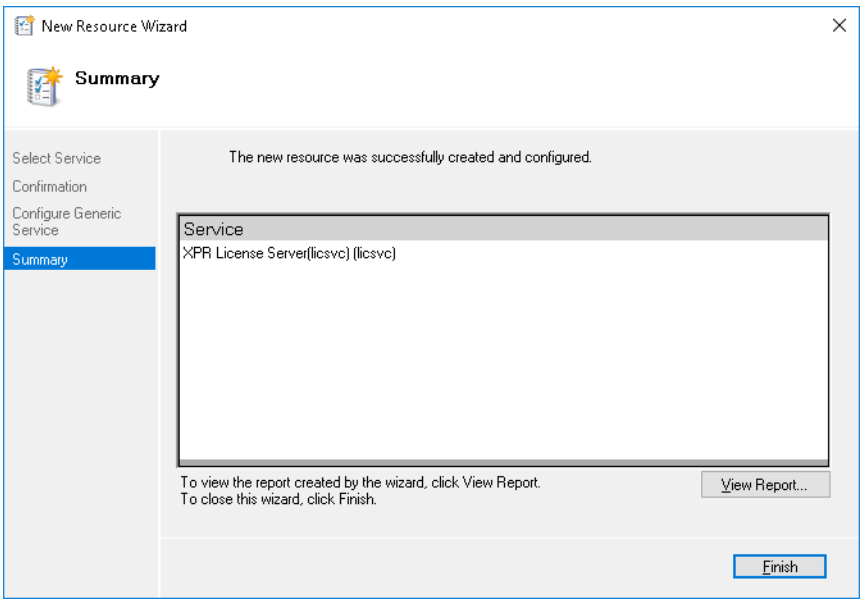
5. Select the entry **XPR License Server(licsvc)**.



6. Click on **Next**.

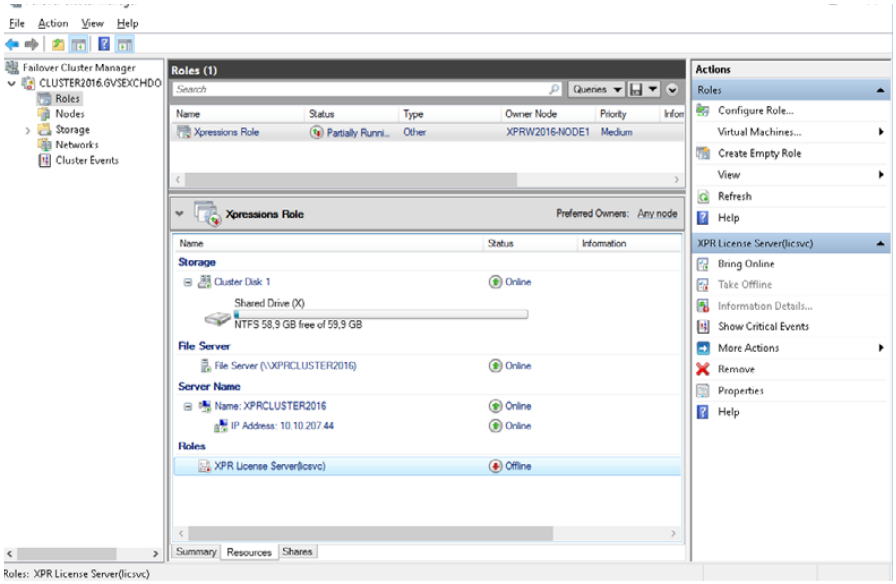


7. Click on **Next**.



8. Click on **Finish**.

   The service resource has now been created. It appears as new entry under the category **Other Resources** in the Failover Cluster Manager. Since the new resource is offline, the status of the application has changed from online to partly online.



   The new resource must now be configured.

   Alternatively you can also use the following command in PowerShell:

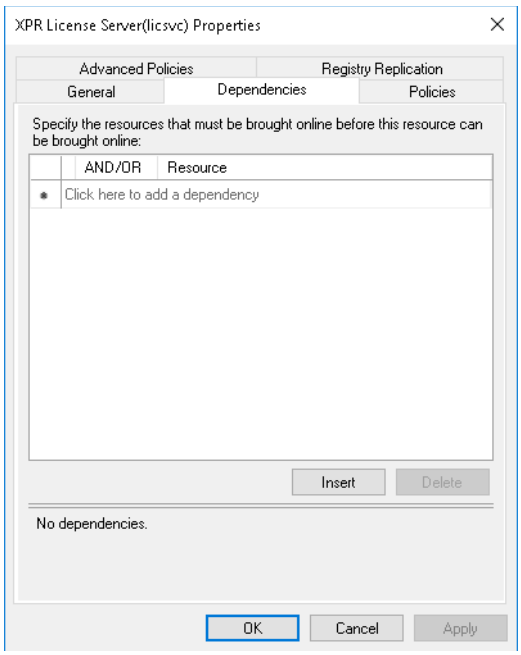
```
Add-ClusterResource -Name <Service Name> -Resourcetype
"Generic Service" -group <Xpressions Role>
```

   e.g.

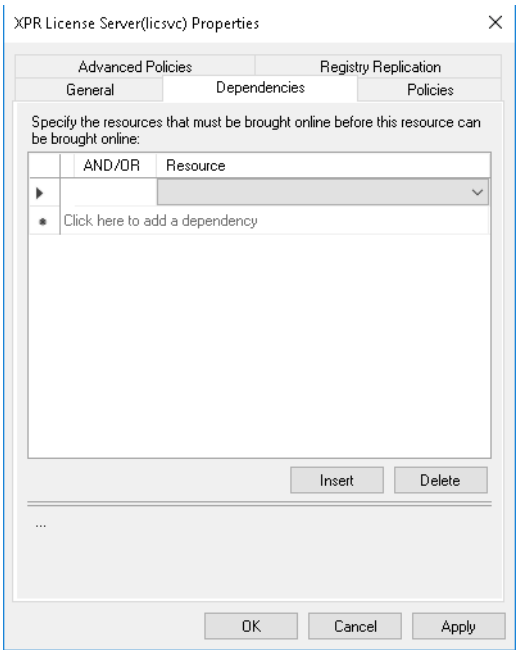
```
Add-ClusterResource -Name "XPR License Server(licsvc)" -
Resourcetype "Generic Service" -group "Xpressions Role”
```

Configuring the resource

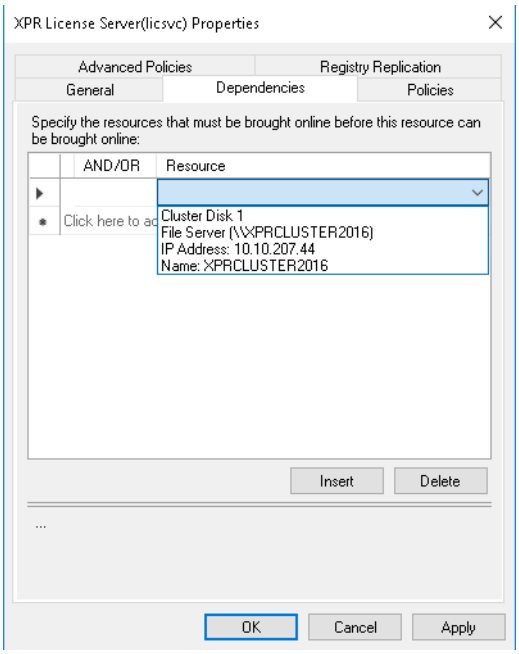
9. Right-click **XPR License Server(licsvc)** resource and select **Properties**.
10. Click on the **Dependencies** tab.



a) Click on the **Insert >** button.



b) Click on the triangle to the right of the newly created field.



c) Select the resources mentioned in the **Dependencies** column of Table 17 on page 257 for the resource to be configured. Select the **File Server** resource, since all network shares are combined in this resource.

11. Click on **Apply**.

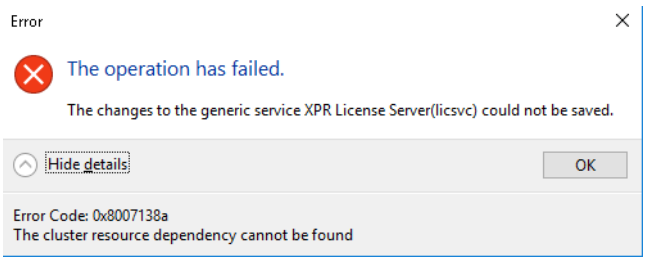
    Alternatively you can use the following command in PowerShell:

    ```
    Add-ClusterResourceDependency –Resource <Resource Name> –Provider <Resource Dependency>
    ```

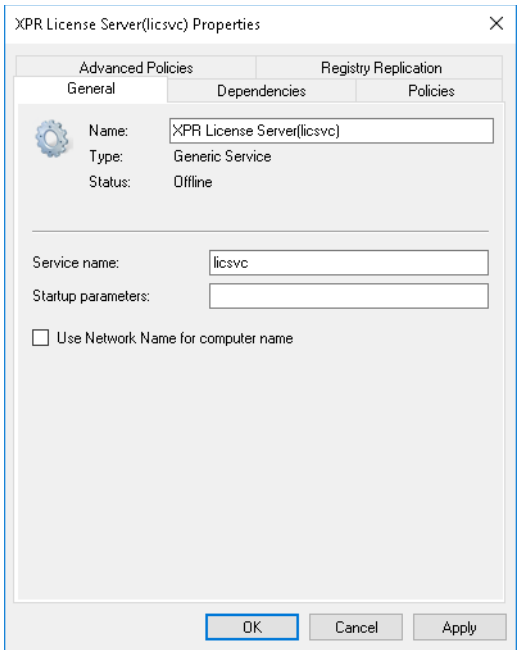
    e.g.

    ```
    Add-ClusterResourceDependency –Resource “XPR License Server(licsvc)” –Provider “File Server (\\XPRCLUSTER2016)”
    ```

NOTE: Execute step 10 and step 11 before step 12d on page 270 as described. Otherwise, you receive an error message when executing step 21 on page 275


Error
The operation has failed.
The changes to the generic service XPR License Server(licsvc) could not be saved.
Hide details
OK
Error Code: 0x8007138a
The cluster resource dependency cannot be found

12. Click on the **General** tab.



a) Change the value of field **Resource Name** according to your requirements

Alternatively you can use the following command in PowerShell:

```
Get-ClusterResource "<resource name>"| % {
$_.Name="<new name>" }
```

e.g.

```
Get-ClusterResource "XPR License Server(licsvc)"| % {
$_.Name="License Service Res"}
```

b) Verify that the name of the new service has been entered in the **Service Name** field. This is `licsvc` for the License Service. You find the values for all further services in Table 17 on page 257 in the **Service name** column.

Alternatively you can also use the following command in PowerShell:

```
Get-ClusterResource <Resource Name> | Set-
ClusterParameter -Name ServiceName -Value <service
name>
```

e.g.

```
Get-ClusterResource "XPR License Server(licsvc)" |
Set-ClusterParameter -Name ServiceName -Value "licsvc"
```

c) Leave the default in field **Startup Parameters**.

Alternatively you can use the following command in PowerShell:

```
Get-ClusterResource -Name <Resource Name> | Set-
ClusterParameter -Name StartupParameters -Value
<Service path to executable file>
```

e.g.

```
Get-ClusterResource -Name ”XPR License Server(licsvc)”
| Set-ClusterParameter -Name StartupParameters -Value
“R:\OpenScape\xprlicsvc\bin\licsvc.exe"
```

d) Activate the option **Use Network Name for computer name**.

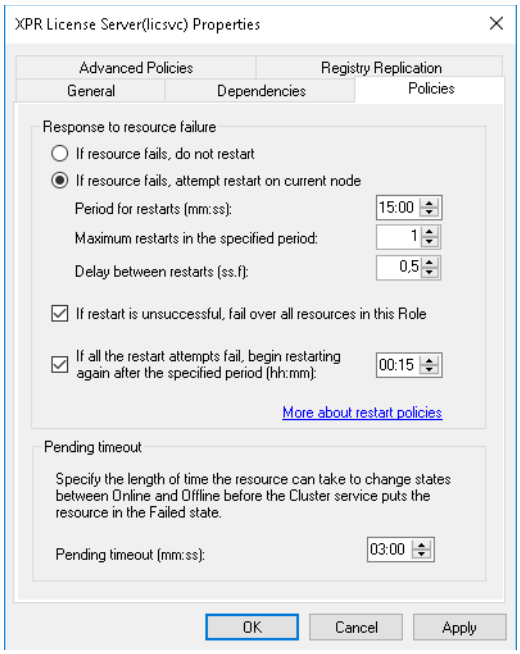
Alternatively you can also use the following command in PowerShell:

```
Get-ClusterResource -Name <Resource Name> | Set-
ClusterParameter -Name UseNetworkName -Value $true
```

e.g.

```
Get-ClusterResource -Name ”XPR License Server(licsvc)”
| Set-ClusterParameter -Name UseNetworkName -Value
$true
```

13. Click on the **Policies** tab.



Perform the settings according to the description in Section 6.1.9, “Failover and Failback”, on page 199.

NOTE: The kernel resources are not necessarily identical with the mandatory resources in Table 17 on page 257.

---

14. Activate the **If resource fails, attempt restart on current node** radio button.
15. Enter in the **Period for restarts (mm:ss)** and **Maximum restarts in the specified period** fields values according to the requirements of the operator of the cluster installation.

    Alternatively you can also use the following command in PowerShell to set the Restart Period value to 15:00 (mm:ss)

    ```
    Get-ClusterResource -Name <Resource Name> | %
    {$_.RestartPeriod="900000";}
    ```

16. If the service that you configure as resource is a kernel resource, activate the **If restart is unsuccessful, fail over all resources in this service or application** checkbox.

    Alternatively you can also use the following command in PowerShell:

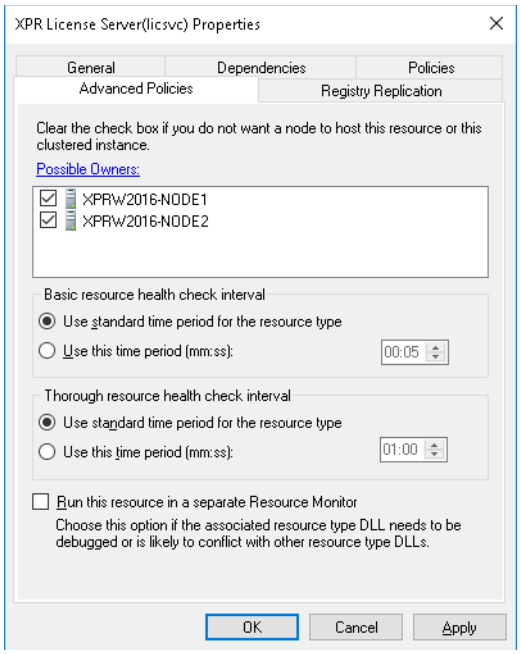
    ```
    Get-ClusterResource -Name <Resource Name> | %
    {$_.RestartAction="2";}
    ```

17. If the service that you configure as resource is not a kernel resource, deactivate the **If restart is unsuccessful, fail over all resources in this service or application** checkbox.

Alternatively you can also use the following command in PowerShell:

```
Get-ClusterResource –Name <Resource Name> | %
{$_.RestartAction="1";}
```

18. Click on the **Advanced Policies** tab.



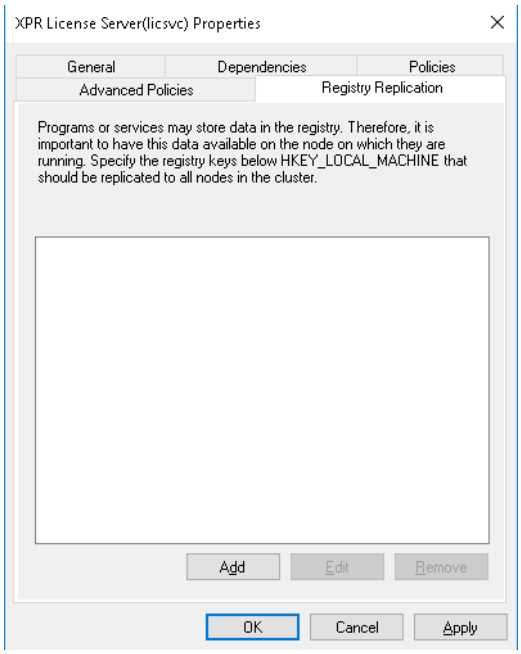
a) Verify that the checkboxes for all cluster nodes are active in the topmost field.

b) Verify that the **Run this resource in a separate Resource Monitor** is inactive.

Alternatively you can also use the following command in PowerShell:

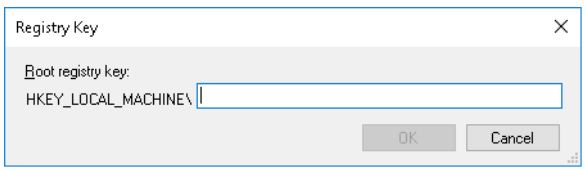
```
Get-ClusterResource –Name <Resource Name> | %
{$_.SeparateMonitor=$false;}
```

19. Click on the **Registry Replication** tab.



a) Click the **Add...** button.

The **Registry Key** entry dialog opens.



b) In the **Root registry key** field enter for the service for which you configure the resource one of the values that are present for this service in the **HKLM registry keys to be entered in the Registry Replication dialog** column of Table 17 on page 257.

c) Click on **OK**.

d) Repeat substeps 19a on page 274 to 19c on page 274 for each value present for this service in the **HKLM registry keys to be entered in the Registry Replication dialog** column of Table 17 on page 257.

Alternatively you can also use the following command in PowerShell:

```
(Get-WmiObject -Class MSCluster_Resource -NameSpace
Root/MSCluster | Where-Object {$_.Name -like
"<Resource
Name>"}).AddRegistryCheckpoint("SOFTWARE\Wow6432Node\
Cycos AG")
```

e.g.

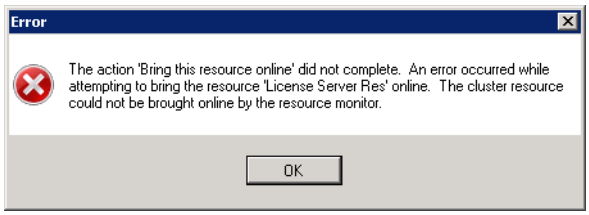
```
Get-WmiObject -Class MSCluster_Resource -NameSpace
Root/MSCluster | Where-Object {$_.Name -like "XPR
```

```
License
Server(licsvc)"}).AddRegistryCheckpoint("SYSTEM\Curre
ntControlSet\Services\licsvc")
```

20. Click on the **OK** button to complete the configuration of the service as resource and to return to the Failover Cluster Management.

21. In the middle section of the Failover Cluster Management select the just created resource with the right mouse button and select **Bring this resource online**.

    If the attempt to bring the resource online fails, you can execute one or both of the following substeps to solve the problem. This depends on whether the resource's state is **Offline** or **Failed** after the attempt or whether the following error message appears:



    a) Repeat step 3 from Section 9.5.3, “Removing Xpressions Service Dependencies”, on page 246 for this resource.

    b) Repeat step 2 from Section 9.3, “Reassignment of the Computer Name in the Registry”, on page 231 for this resource.

NOTE: The Eventlog may deliver further notes for bug fixing. The meaning of an error code is delivered by the `net helpmsg <error code>` command. The `net helpmsg 1075` command delivers for example the following output:

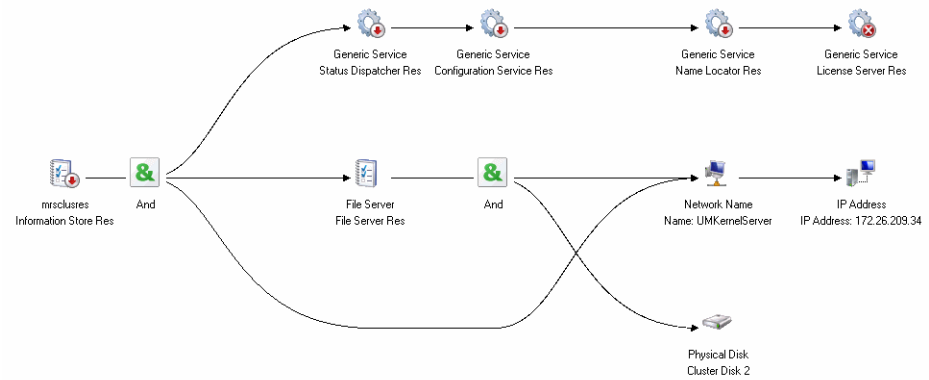
```
The dependency service does not exist or has been marked
for deletion.
```

    Bring the resource online.

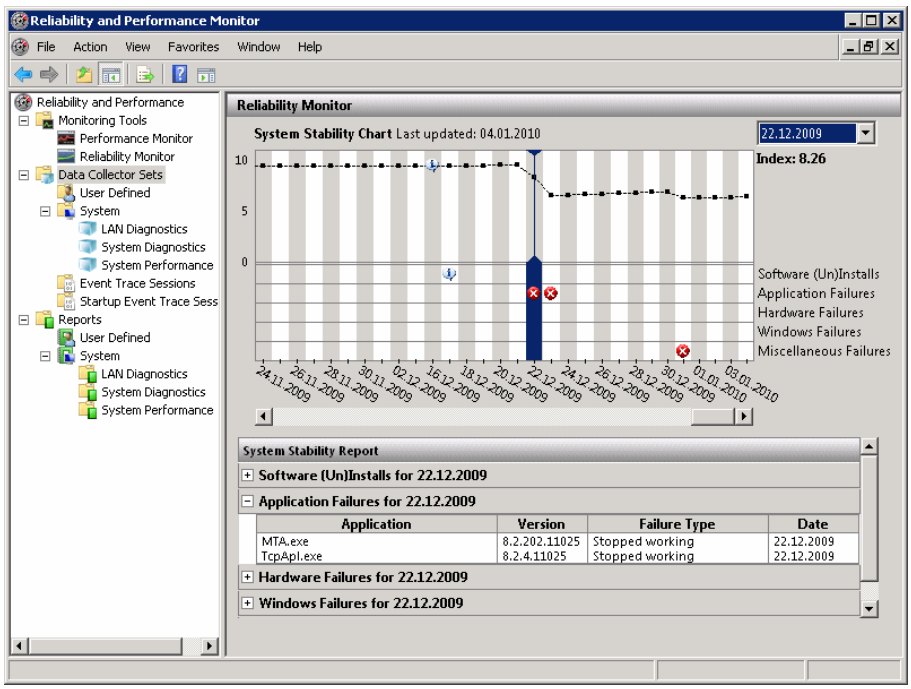
22. Repeat step 1 on page 262 to step 21 on page 275 for each further mandatory service except for XPR Information Store in the sequence given in Table 17 on page 257. Use the values according to Table 17 on page 257. The analog process for the XPR Information Store is described in Section 9.7.3, “Creating the Resource XPR Information Store Res”, on page 278.

23. Repeat step 1 on page 262 to step 21 on page 275 for each further optional service in Table 17 on page 257. Use the values according to Table 17 on page 257. The sequence in which you configure the optional XPR services as resources is irrelevant. Therefore they all have the same consecutive number in Table 17 on page 257. Please use the service management to learn which of these XPR services are available on your XPR server.

A resource's dependency on other resources is shown in a tree structure when you click it with the right mousebutton and select **Show Dependency Report**.



You can obtain further information about the system from the Reliability and Performance Monitor. To start this monitor, select **start** > **Run** and enter the command `performance` in the **Open** field.



9.7.3 Creating the Resource XPR Information Store Res

1. In the Failover Cluster Manager, rightclick the folder of the application for the XPR server on the first node.
2. Verify that the application for the XPR server has status **Online** or **Partial Online**.
3. Select **Add a resource > More resources > mrsclusres** in the context menu.

   IMPORTANT: Very important! Create only a single resource of type **mrsClusRes**. If another resource of this type is created, the Failover Cluster Management cannot be operated anymore.

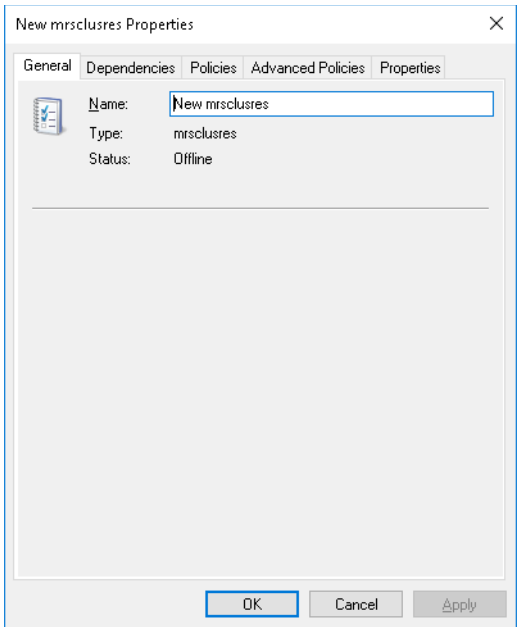
4. An entry **New mrsclusres** is created in the Failover Cluster Management under the **Other Resources** category.

   Alternatively you can also use the following command in PowerShell:

   ```
   Add-ClusterResource -Name <Infostor Resource Name> -
   Resourcetype "mrsclusres"
   ```

Configuring the resource

5. Double-click this entry.



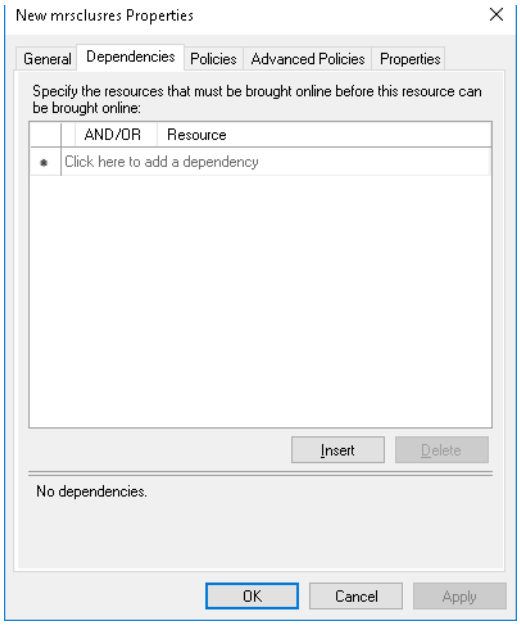
NOTE: In case of a resource of type **mrsClusRes**, no parameters and no Time Zone Setting with Resources brought Offline

6. Change the value of field **Resource Name** according to your requirement

   Alternatively you can also use the following command in PowerShell:

   ```
   Get-ClusterResource -Name <Resource Name> | %
   {$_.Name="<Resource Name>";}
   ```

7. Click on the **Dependencies** tab.



a) Click on the **Insert** > button.

b) Click on the triangle to the right of the newly created field.

c) Select **Cluster Disk**.

d) Click on the **Insert** > button.

e) Click on the triangle to the right of the newly created field.

f) Select the **Status Dispatcher Res**.

g) Click on the **Insert** > button.

h) Click on the triangle to the right of the newly created field.

i) Select the **Network Name** resource.

NOTE: It is not sufficient to enter the dependencies of the resource **XPR Information Store Resource** on **File Server** resource and **Status Dispatcher** Resource, though XPR Information Store Resource depends on **Cluster Disk** via **File Server** resource and on **Network Name** via **File Server** resource and via **Status Dispatcher** Resource indirectly.

Alternatively you can also use the following commands in PowerShell:

```
Add-ClusterResourceDependency –Resource <Resource> –
Provider <Provider Resource>
```

in this case:

- <Resource> would be Infostor Resource name

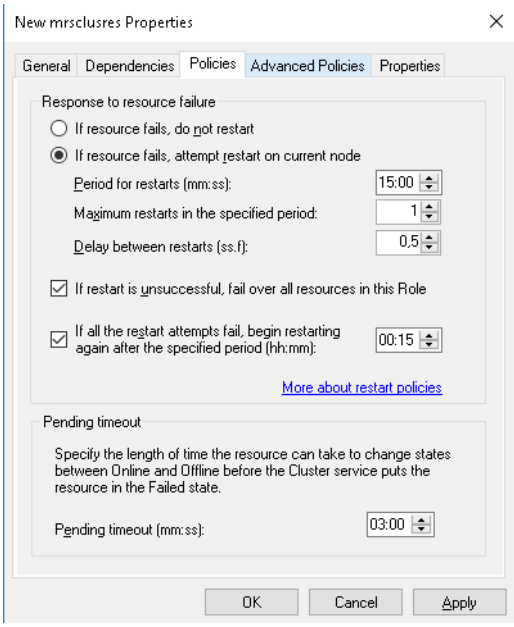
- <Provider Resource> would be Infostor Resource dependencies:

  - Network Name Resource
  - Cluster Disk Resource
  - XPR Status Dispatcher(xmrsvc) Resource

In order to check the correct Resource names from the Xpressions Cluster Role, execute the following command:

```
Get-ClusterResource
```

8. Click on the **Policies** tab.



9. Set the time for **if all the restart attempts fail, begin restarting again after the specified period (hh:mm)** to 00:15.

   Alternatively you can also use the following command in PowerShell to set the `Retry Period On Failure` value to 00:15 (hh:mm):

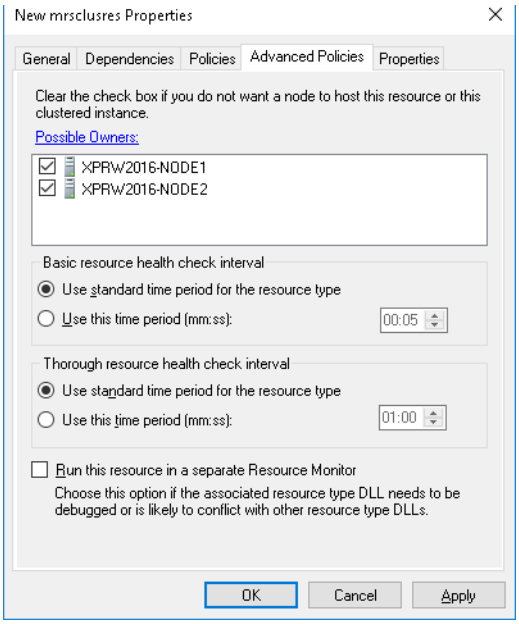
   ```
   Get-ClusterResource –Name <Resource Name> | %
   {$_.RetryPeriodOnFailure="900000";}
   ```

10. As infostor is a kernel resource, activate the I**f restart is unsuccessful, fail over all resources in this service or application** checkbox

Alternatively you can also use the following command in PowerShell:

```
Get-ClusterResource -Name <Resource Name> | %
{$_.RestartAction="2";}
```

11. Click on the **Advanced Policies** tab.



a) Verify that the checkboxes for all cluster nodes are active in the topmost field.

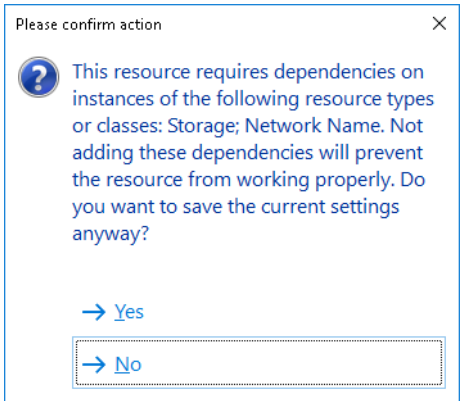
b) Verify that the **Run this resource in a separate Resource Monitor** is inactive.

Alternatively you can also use the following command in PowerShell:

```
Get-ClusterResource -Name <Resource Name> | %
{$_.SeparateMonitor=$false;}
```

12. Click on the **OK** button to complete the configuration of the service as resource and to return to the Failover Cluster Manager.

13. The following error message appears when no dependency has been entered or some are missing:



a) Click on **No**.

b) Execute step 7 on page 279. Be sure to make XPR Information Store Res dependent on all resources mentioned there.

c) Click on **OK**.

14. In the middle section of the Failover Cluster Manager select the just created resource with the right mouse button and select **Bring this resource online**.

    If the attempt to bring the resource online fails, you can execute one or both of the following substeps to solve the problem. This depends on whether the resource's state is **Offline** or **Failed** after the attempt or an error message appears:

    a) Repeat step 3 from Section 9.5.3, “Removing Xpressions Service Dependencies”, on page 246 for this resource.

    b) Repeat step 2 Section 9.3, “Reassignment of the Computer Name in the Registry”, on page 231 from for this resource.

NOTE: The Eventlog may deliver further notes for bug fixing. The meaning of an error code is delivered by the `net helpmsg <error code>` command. The `net helpmsg 1075` command delivers for example the following output:

```
The dependency service does not exist or has been marked
for deletion.
```

---

15. Bring the resource online.

NOTE: When creating and configuring a resource of type mrsClusRes, no values are entered for the registry replication.

9.7.4 Time Zone Setting with Resources brought Offline

If you do not want to activate/deactivate the time zone support, skip this section.

If you have already followed the instructions in Section 4.4.13, “Setting Time Zones with stopped Services”, on page 120, skip this section.

The file `<XPR_Install>\bin\TimeZoneSupport.exe` controls the use of time zones in the XPR server. It has the effect that time stamps are adjusted in the database. You can obtain details of the time zone support from the administrator documentation *OpenScape Xpressions Server Administration*.

Execute this file only if you want to activate/deactivate the time zone support and no more and no fewer of the following resources of the XPR service resources are online:

- XPR License Service Resource(licsvc)
- XPR Name Locator Resource(nameloc)
- XPR Configuration Service Resource(cfgsvc)
- XPR Status Dispatcher Resource(xmrsvc)
- XPR Information Store Resource(infostor)

How to reach this state:

1. Bring all services offline.
   a) In the Failover Cluster Manager, rightclick the folder of the application for the XPR server.
   b) Select **Take this resource offline** from the context menu.

   After some time all XPR service resources are displayed as offline.
2. Rightclick the resource XPR *Information Store Res*ource and select **Bring this resource online**.

   All resources in the above list are brought online.
3. Open a command prompt.
4. Navigate to the `<XPR_Install>\bin\` directory.
5. If you want to activate the time zone support, enter the following command:

   ```
   TimeZoneSupport.exe on
   ```
6. If you want to deactivate the time zone support, enter the following command:

   ```
   TimeZoneSupport.exe off
   ```

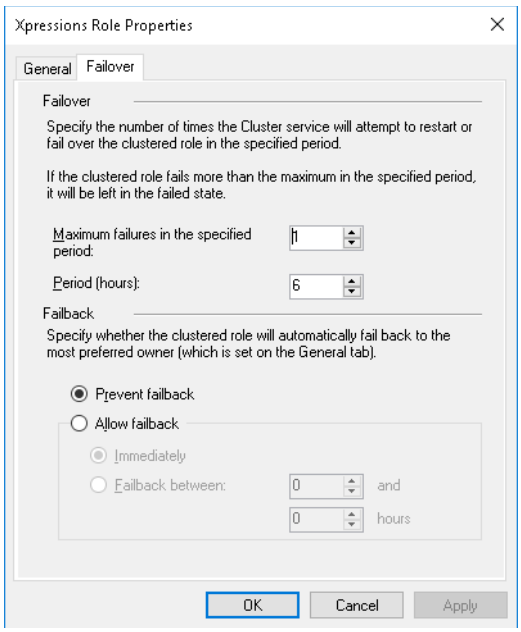
7. Bring all XPR service resources you have taken offline in step 1 on page 284 online again by rightclicking these resources in the Failover Cluster Manager and selecting **Bring this resource online**.

NOTE: You need to execute the file `<XPR_Install>\bin\TimeZone-Support.exe` on one cluster node only. It need not be executed again on another node. The changes it causes in the database are replicated to another node in the course of a replication. It is irrelevant on which node this file is executed.

9.7.5 Settings of the Failover Role

Perform the following steps for all resources:

1. In the left-hand section of the Failover Cluster Manager, rightclick the application for the XPR and select the **Properties** menu option.
2. Click on the **Failover** tab.



The **Maximum failures in the specified period** field value indicates the maximum number of failovers performed within the time specified in the **Period** field, thus how often the entire application is shifted to the other node. If, for example, the **Maximum failures in the specified period** field has value `10` and the **Period** field value `6`, a maximum of 10 failovers is performed within 6 hours.

Enter suitable values in the **Maximum failures in the specified period** and **Period** fields. These may vary from case to case. We recommend to set the **Maximum failures in the specified period** field to value `1` and the **Period** field to value 8.

NOTE: These settings, as they are described in step 13 on page 271 to step 17 on page 271 and in step 8 on page 281 to step 14 on page 283, apply for the application and not for a single resource.

---

3. Click on **OK**.

Alternatively you can also use the following command in PowerShell:

```
Get-ClusterGroup –Name <Xpressions Role Name> | %
{$_.FailoverThreshold=”1”;$_.FailoverPeriod=”6”;}
```

where the parameters references are:

- `FailoverThreshold` **refers to Maximum failures in the specified period**
- `FailoverPeriod` **refers to Period**

9.8 Replicating XPR Services as Resources to the second Node

The XPR services in the cluster must be replicated to each cluster node. This comprises the moving of the services, the installation of the services and the privilege assignment for the services.

The instructions given in Section 9.8.1, “Shifting the XPR Services as Resources on the second Node”, on page 288 and in Section 9.8.2, “Installation and Privilege Assignment of the XPR Services on the second Node”, on page 289 need to be performed for all further nodes of the cluster. For each of these nodes all the instructions of the two sections have to be followed before you can begin with the instructions for another node.

9.8.1 Shifting the XPR Services as Resources on the second Node

Execute the following steps on the first node:

1. Execute the following substeps if you have followed our recommendation in step 1 on page 262 to set the second node to **Pause**. This served for preventing a failover.
   a) Open the Failover Cluster Management under **start** > **Windows** > **Administrative Tools** > **Failover Cluster Manager**.
   b) Rightclick **Nodes** > **<name of the second node>** in the left-hand section.
   c) Select the **Resume** option.
   d) Rightclick **Nodes** > **<name of the first node>** in the left-hand section.
   e) Set the first node to **Pause**.
2. Bring all services offline.
   a) In the Failover Cluster Manager, rightclick the folder of the Role for the XPR server.
   b) Select **Stop Role** from the context menu.
3. Now shift the current application to the second node.
   a) In the Failover Cluster Manager, rightclick the folder of the application for the XPR server.
   b) If you have installed the SmsIpApl, execute the following command for registering the AxMmCtl.dll on the second node: `regsvr32 c:\□□□□l install>□□pb□□□□□□x.a`Example: `regsvr32 c:\□□\b>s□□\\xpr\bin\AxMmCtl.dll.`
   c) Select the menu option **Move > Select Node**.

d) Select the **<second node>**.

e) Click **OK**.

All resources of the current node are shut down. The cluster will then attempt to transfer these resources to the second node and reboot them there. The Failover Cluster Manager indicates this by showing the name of the second node instead of the first node's name as value for **Current owner** in the middle section.

9.8.2 Installation and Privilege Assignment of the XPR Services on the second Node

The services of the application for the XPR server have been moved to the second node in the previous steps. However, they have not been installed there. Furthermore, no rights have been configured for these services on the second node.

1. Log in on the second node.
2. Open the Failover Cluster Management on the second node under **start > Windows > Administrative Tools > Failover Cluster Manager**.

The following steps will describe the service installation and privilege assignment by way of the License Service (licsvc) example.

NOTE: **C++ 2008 Redistributable** must be installed on the nodes manually for granting a smooth operation of the license service.

The same process must then be performed for each further mandatory service in Table 19 in the given sequence much in the same manner (see step 13 on page 294).

IMPORTANT: This order of mandatory services must definitely be observed during the installation and privilege assignment, as each mandatory service in Table 17 on page 257 depends on the existence of the service that precedes it.

Thereafter, analog steps must be executed for the optional services in Table 17 on page 257 (see step 14 on page 295), provided, they have been installed on your XPR server. The sequence in which you configure and assign privileges to the optional XPR services as resources is irrelevant. Therefore they all have the same consecutive number in the table. Please use the service management to learn which of these XPR services are available on your XPR server.

The **Installation in the cluster** column indicates whether an XPR service has to be (value: Mandatory) or can be (value: Optional) installed in the cluster.

Only for XPR services listed in Table 17 on page 257 or Table 19 on page 290 you were allowed to select the corresponding features listed in Table 4-2 on page 96 during the XPR installation.

Sequence	Service name in the service management	Installation in the cluster	Installation command
1	XPR License Service (licsvc)	Mandatory	sc create licsvc binpath= ".\OpenScape\xprlicsvc\\licsvc.exe"
2	XPR Name Locator (nameloc)	Mandatory	sc create nameloc binpath= "<XPR_Install>\bin\ nameloc.exe"
3	XPR Configuration Service (cfgsvc)	Mandatory	sc create cfgsvc binpath= "<XPR_Install>\bin\ cfgsvc.exe"
4	XPR Status Dispatcher (xmrsvc)	Mandatory	sc create xmrsvc binpath= "<XPR_Install>\bin\ xmrsvc.exe"
5	XPR Information Store (infostor)	Mandatory	sc create infostor binpath= "<XPR_Install>\bin\ infostor.exe"
6	XPR Message Router (mta)	Mandatory	sc create mta binpath= "<XPR_Install>\bin\ mta.exe"
7	XPR Administrator (mrs)	Mandatory	sc create mrs binpath= "<XPR_Install>\bin\ mrs.exe"
8	XPR TCP/IP Transport Layer(tcpApl)	Mandatory	sc create tcpapl binpath= "<XPR_Install>\bin\ tcpapl.exe"
9	stunnel	Mandatory	sc create stunnel binpath= "<XPR_Install>\bin\stunnel\ stunnel.exe"
10	XPR Directory Service (DirSvc)	Mandatory	sc create dirsvc binpath= "<XPR_Install>\bin\ dirsvc.exe"
11	XPR Internet Mail APL (SmtpApl)	Optional	sc create smtpapl binpath= "<XPR_Install>\bin\ smtpapl.exe"
11	XPR Vm2Txt APL(VM2TXTAPL)	Optional	sc create smtpapl binpath= "<XPR_Install>\bin\vm2txtapl.exe"
11	XPR Web APL (WebApl)	Optional	sc create webapl binpath= "<XPR_Install>\bin\ webapl.exe"
11	XPR Mail APL (MailApl)	Optional	sc create mailapl binpath= "<XPR_Install>\bin\ mailapl.exe"
11	XPR Lear APL (Lear)	Optional	sc create lear binpath= "<XPR_Install>\bin\ lear.exe"
11	XPR Notification APL (NotApl)	Optional	sc c create notapl binpath= "<XPR_Install>\bin\ notapl.exe"
11	XPR Lpr APL (LprApl)	Optional	sc create lprapl binpath= "<XPR_Install>\bin\ lprapl.exe"
11	XPR Csta Apl (CstaApl)	Optional	sc create cstaapl binpath= "<XPR_Install>\bin\ cstaapl.exe"
11	XPR Cti APL(CtiApl) Note: With CSTA connection	Optional	sc create ctiapl binpath= "<XPR_Install>\bin\ ctiapl.exe"
11	XPR ip APL (ipApl) Note: Without TTS and without ASR	Optional	sc create ipapl binpath= "<XPR_Install>\bin\ ipapl.exe"
11	XPR Ldap APL (LdapApl)	Optional	sc create ldapapl binpath= "<XPR_Install>\bin\ ldapapl.exe"
11	XPR Presence APL (PresenceApl)	Optional	sc create presenceapl binpath= "<XPR_Install>\bin\ presenceapl.exe"
11	XPR Xml APL (XmlApl)	Optional	sc create xmlapl binpath= "<XPR_Install>\bin\ xmlapl.exe"
11	XPR VM APL (VMApl)	Optional	sc create vmapl binpath= "<XPR_Install>\bin\ vmapl.exe"
11	XPR Printer APL (PrintApl)	Optional	sc create printapl binpath= "<XPR_Install>\bin\ printapl.exe"
11	XPR Isdn APL (IsdnApl) Note: Without TTS and without ASR	Optional	sc create isdnapl binpath= "<XPR_Install>\bin\ isdnapl.exe"

Table 19 XPR Services to be installed on the second Node on Windows Server 2008/2012

Sequence	Service name in the service management	Installation in the cluster	Installation command
11	XPR SMS Large Account APL (SmsIPApl)	Optional	sc create smsipapl binpath= “XPR_Install>\bin\ smsipapl.exe”
11	XPR Serial APL (V24Apl)	Optional	sc create v24apl binpath= “<XPR_Install>\bin\ v24apl.exe”
11	XPR FileInterface APL (FiApl)	Optional	sc create fiapl binpath= “<XPR_Install>\bin\ fiapl.exe”
11	XPR Exchange Connector for i386 (<XPR server name>:<Exchange 2003 server name>)	Optional	sc create <XPR server name>:<Exchange 2003 server name> binpath= “<XPR_Install>\bin\ exchapl.exe”
11	XPR Exchange Connector for i386 (<XPR server name>:<Exchange 2007 server name>)	Optional	sc create <XPR server name>:<Exchange 2007 server name> binpath= “<XPR_Install>\bin\ e2k7apl.exe”
11	XPR Exchange UM APL	Optional	sc create exumapl binpath= “<XPR_Install>\bin\ exumapl.exe”
11	XPR Lotus Notes APL (LNApl)	Optional	sc create lnapl binpath= “<XPR_Install>\bin\ lnapl.exe”
11	XPR Lotus Notes UM APL (LnUmApl)	Optional	sc create lnumapl binpath= “<XPR_Install>\bin\ lnumapl.exe”
11	XPR SAP R/3 APL (SapR3Apl)	Optional	sc create sapr3apl binpath= “<XPR_Install>\bin\sapr3apl.exe”
	IMPORTANT: Setting up this APL on a Windows cluster **has been released only project-specifically**.		
11	XPR SAPphone APL(SAPphoneApl)	Optional	sc create sapphoneapl binpath= “<XPR_Install>\bin\sapphoneapl.exe”
	IMPORTANT: Setting up this APL on a Windows cluster **has been released only project-specifically**.		

Table 19 XPR Services to be installed on the second Node on Windows Server 2008/2012

3. Enter the following command in a command prompt:

   ```
   sc create <service name> binpath= “<binary file path>”
   ```

   Example:

   ```
   sc create licsvc binpath=
   “R:\OpenScape\xprlicsvc\licsvc.exe”
   ```

IMPORTANT: Please note that a blank must follow the equals sign.

NOTE: You can also add the service name and credentials in one command line. This simplifies the next steps.

```
sc create <service name> binpath= "<binary file path>"
DisplayName= "<Service name in the service management>"
obj= "<domain>\<service account>" password= "<password>"
```

Example:

```
sc create licsvc binpath=
```

```
"r:\OpenScape\xprlicsvc\bin\licsvc.exe" DisplayName=
"XPR License Server(licsvc)" obj= "domain\administrator"
password= "1234"
```

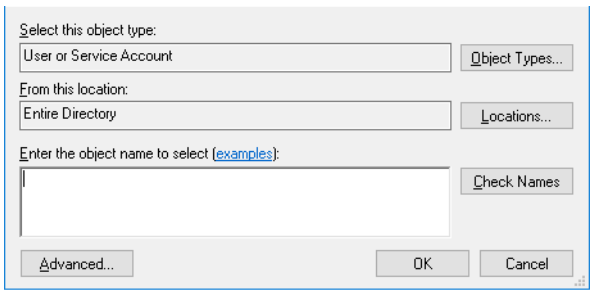
4. If the prerequisites are not installed correctly, the following error message will appear: "FAILURE: The MRS License Service cannot be installed. The service implementation dependent initialization return FALSE. The Event Log may contain additional information.“ In this case, please follow the instructions given in Section 9.4.1, “Installing “Prerequisites“ on the Nodes”, on page 235.

Now the necessary privileges have to be assigned to the service manually.

5. Open the service management. To do this, click on **Start > Windows > Administrative Tools > Services**.
6. Click the **licsvc** service with the right mouse button.

NOTE: The service is not yet displayed as **XPR License Service(licsvc)** in the service management. It is only shown after the reboot of the second node in step 7 on page 297, since not until this reboot the corresponding keys that were replicated from the first to the second node are read out of the registry.

7. In the context menu select the **Properties** option and then switch to the **Log On** tab.
   a) Select the option field **This account** and enter the user account. This user is required for the XPR server administration and is identical with the user account already previously used for the XPR shares (see Section 9.7, “Configuring XPR Services as Resources”, on page 255). Enter the password in the **Password** field and confirm it in the **Confirm password** field.
   b) You can also search for a user account. To do so, click on the **Browse...**button. The dialog **Select User** opens.



8. Enter the user account to be searched for in the **Enter the object name to select (examples):** field and click on the **Check Names** button

   IMPORTANT: If you execute this step for the services **XPR Exchange Connector for i386 (<XPR server name>:<Exchange server name>)** or **XPR Exchange UM APL** (see Table 19 on page 290), a user account with further special privileges must be used for these services instead of the user account described in Section 9.7, “Configuring XPR Services as Resources”, on page 255. The setup and administrator documentation *OpenScape Xpressions Microsoft Exchange Gateway* delivers comprehensive details on the required privileges under the term **Service Account**. Please keep in mind that setting up the Exchange connection requires more privileges than operating it.

9. Click on the **OK** button to define the selected user account for the current service.

10. Confirm the dialog with the information that this account has now the privilege to log on as a service by clicking on the **OK** button.

    Alternatively you can also use the following command line:

    ```
    sc config <Service> obj= <NETWORK USER> password= <USER PASSWORD>
    ```

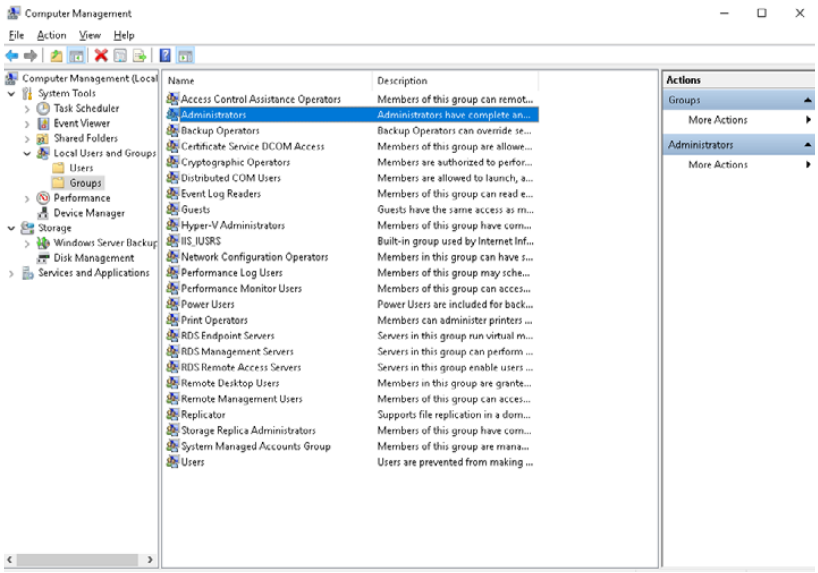
11. Add this user account to the administrator group.

    a) To do so, click on **Start > Windows > Administrative Tools > Computer Management**.

    b) Select in the left list the entry **System Tools > Local Users and Groups > Groups**.

    NOTE: Select under **Windows Server 2008/2012 R2 64 bit** in the list on the left-hand side the entry **Configuration > Local Users and Groups > Groups**.

    c) Click in the right list with the right mouse button on the group **Administrators**.



d) Select the **Properties** option from the context menu.

e) Click the **Add...** button.

f) Enter the user name in the lowermost field and click on the **Check Names** button.

g) Click on **OK**.

h) Click on **OK**.

12. Select the license service entry with the right mouse button in the Failover Cluster Management and then select **Bring this resource online**.

IMPORTANT: Be sure to execute this step. It may be a requirement for XPR services to be installed mandatorily when such XPR services are installed at a later date.

If the attempt to bring the resource online fails, you can execute one or both of the following substeps to solve the problem. This depends on whether the resource's state is **Offline** or **Failed** after the attempt or an error message appears:

a) Repeat step 2 Section 9.5.3, “Removing Xpressions Service Dependencies”, on page 246 for this resource.

b) Repeat step 2 Section 9.3, “Reassignment of the Computer Name in the Registry”, on page 231 for this resource.

13. Repeat steps 3 on page 291 to 10 on page 293 and step 12 on page 294 for every further mandatory XPR service in the sequence given in Table 19 on page 290.

14. Repeat steps 3 on page 291 to 10 on page 293 and step 12 on page 294 for each optional XPR service in Table 19 on page 290. The sequence is irrelevant.

9.8.3 Installing Hotfixes

Install all hotfixes provided for the XPR version you have purchased.

9.9 Testing the XPR Server in the Cluster

To test the performed installation, carry out a manual failover in the Failover Cluster Manager.

1. Open the Failover Cluster Manager under **start > Windows > Administrative Tools > Failover Cluster Manager**.
2. Bring the first node online again. To this, click with the right mouse button on the corresponding node and select **Resume** from the context menu.
3. Perform a manual failover. In the Failover Cluster Manager click with the right mouse button on the Role for the cluster in which the XPR server has been installed. Select the menu option **Move this service or application to another node** > **1 - Move to node <name of the first node>** from the context menu.

   All XPR server resources are brought offline on the second node and subsequently rebooted on the first node and brought online.
4. In the Failover Cluster Manager click with the right mouse button on the Role for the cluster in which the XPR server has been installed. Select the menu option **Move > Select Node. Select <name of the second node>** from the context menu.

   All XPR server resources are brought offline on the first node and subsequently rebooted again on the second node and brought online.
5. A successful test completes the XPR server installation in the cluster. If this test fails, verify that all requirements (Section 9.1, “Checklist for Preparing the Cluster Installation”, on page 229) have been met, check your settings once again, or contact the network administrator in charge.
6. Registry key

   HKLM\SOFTWARE\Wow6432Node\PP-COM\MRS\Services\
   AplDelay - REG_MULTI_SZ

   Set this registry key order to delay any Xpressions service inicialization when starting up Xpressions.
   This is used specially on Failover Cluster installations.
   In case of a failover scenario NotApl and ConApl should be started only after the voicemail is restablished for the users.

   with syntax:
   apl name,delay in minutes

   Example:
   ConApl,5
   NotApl,10

7. You can reboot the second node for all XPR services to appear in the usual spelling (for example **XPR License Service(licsvc)** instead of **licsvc**) in the service management.

   If after rebooting the second node and initiating a failover from the first to the second node a resource is not automatically brought online on the second node, execute the following substeps:

   a) Execute step 3 on page 247 for the service that corresponds to this resource on the seconds node.

   b) Bring the resource online.

   c) Execute step 3 on page 247 for the service that corresponds to this resource once more.

9.10 Satellite Environment with clustered Kernel Computer

IMPORTANT: Please heed the note for the XPR Connection APL beneath table Table 18 on page 261, “XPR Services that cannot be installed on a Cluster on Windows 2008/2012”.

In a satellite environment with clustered kernel computer, some entries in the cluster's registry must be supplemented. Proceed as follows:

1. Open the Failover Cluster Manager and bring the complete application offline.
2. Bring the license service online again. This is required to replicate the modifications performed in the following on the node's registry to the cluster's database.
3. Open the registry on the node on which the license service is currently running and look for the following key:

   `HKLM\SOFTWARE\Wow6432Node\PP-COM\MRS\Services\Kernel`
4. Open this key and verify that the `NameLoc` and `CfgSvc` entries are supplemented with the network name of the corresponding computer for each available satellite.

   Example:

   Supposed, there are two satellite computers with the network name `SATEL1` and `SATEL2`. The corresponding entries in the key then read:

   ```
   NameLoc,SATEL1
   CfgSvc,SATEL1
   NameLoc,SATEL2
   CfgSvc,SATEL2
   ```

   IMPORTANT: Verify that the commas are not followed by blanks.
5. Open the following key:

   `HKLM\SOFTWARE\Wow6432\PP-COM\MRS\Services\Access Protocol Layers`
6. Verify that the network name of the corresponding satellite computer is entered for all APLs that run on one of the satellites. Example:

   Supposed, an ISDN APL runs on the satellite computer SATEL1 and a CTI APL on the satellite computer SATEL2. The corresponding entries in the key then read:

   ```
   IsdnApl,SATEL1
   CtiAPl,SATEL2
   ```

7. Bring the entire application online again.

   Configuring a satellite environment with a clustered kernel computer is thus complete.

Appendices

A Appendix A

A.1 Using a Microsoft SQL Server

For details on using **Microsoft SQL Serv**er please refer to the *OpenScape Xpressions V7 Server Installation, Installation Guide - Appendix A.*

Index