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Kemp® LoadMaster®

Deployment Guide AGFA

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Introduction

Enterprise Imaging Exchange is AGFA Healthcare's Picture Archiving and Communication System (PACS). It provides the ability to transfer patient studies between hospitals quickly, securely, and reliably without reliance on CDs or DVDs. AGFA's Enterprise Imaging Exchange helps solve the operational challenges of the enterprise imaging strategy, by establishing a secure health information exchange network between collaborating health providers.

Solving the operational challenges of today's enterprise imaging strategy requires that access to AGFA's Core & Web Servers is always-on and the user application experience is optimal and secure.

The LoadMaster delivers an exceptional, cost effective, and easy to use solution which by employing High Availability, Global Server Load Balancing (GSLB), intelligent load balancing, and intelligent server health checking can support AGFA's always-on application experience initiative.

This document provides guidance and recommended settings on how to load balance AGFA Enterprise Imaging Exchange with a LoadMaster.

Document Purpose

This document provides the recommended LoadMaster settings used when load balancing AGFA Enterprise Imaging Exchange. The Progress Kemp Support Team is available to provide solutions for scenarios not explicitly defined. For further details, refer to the: LoadMaster Support and Learning Hub.

2

Template

Progress Kemp has developed a template containing our recommended settings for this workload. You can install this template to help create Virtual Services (VSs) because it automatically populates the settings. You can use the template to easily create the required VSs with the recommended settings. For some workloads, additional manual steps may be required such as assigning a certificate or applying port following. These steps are covered in the document, if needed.

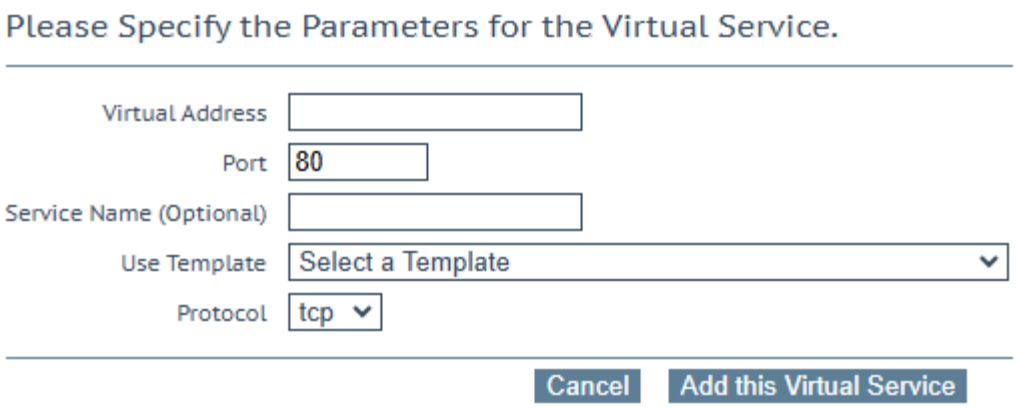
You can remove templates after use and this will not affect deployed services. If needed, you can make changes to any of the VS settings after using the template.

Download released templates from the following page: LoadMaster Templates.

You can import templates to the LoadMaster through the **Manage Templates** page under **Virtual Services** in the main menu of the LoadMaster User Interface (UI).

Click **Choose File**, select the template to install and click **Add New Template**. The template will then be available to select when you are adding a new Virtual Service.

To begin the process of creating a new Virtual Service, click **Virtual Services** and **Add New** in the main menu.



This opens the Virtual Service parameters page which prompts to enter the Virtual IP (VIP) address of the Virtual Service, the port, and the name to give the service and the protocol. You can select a previously-imported template in the **Use Template** drop-down list.

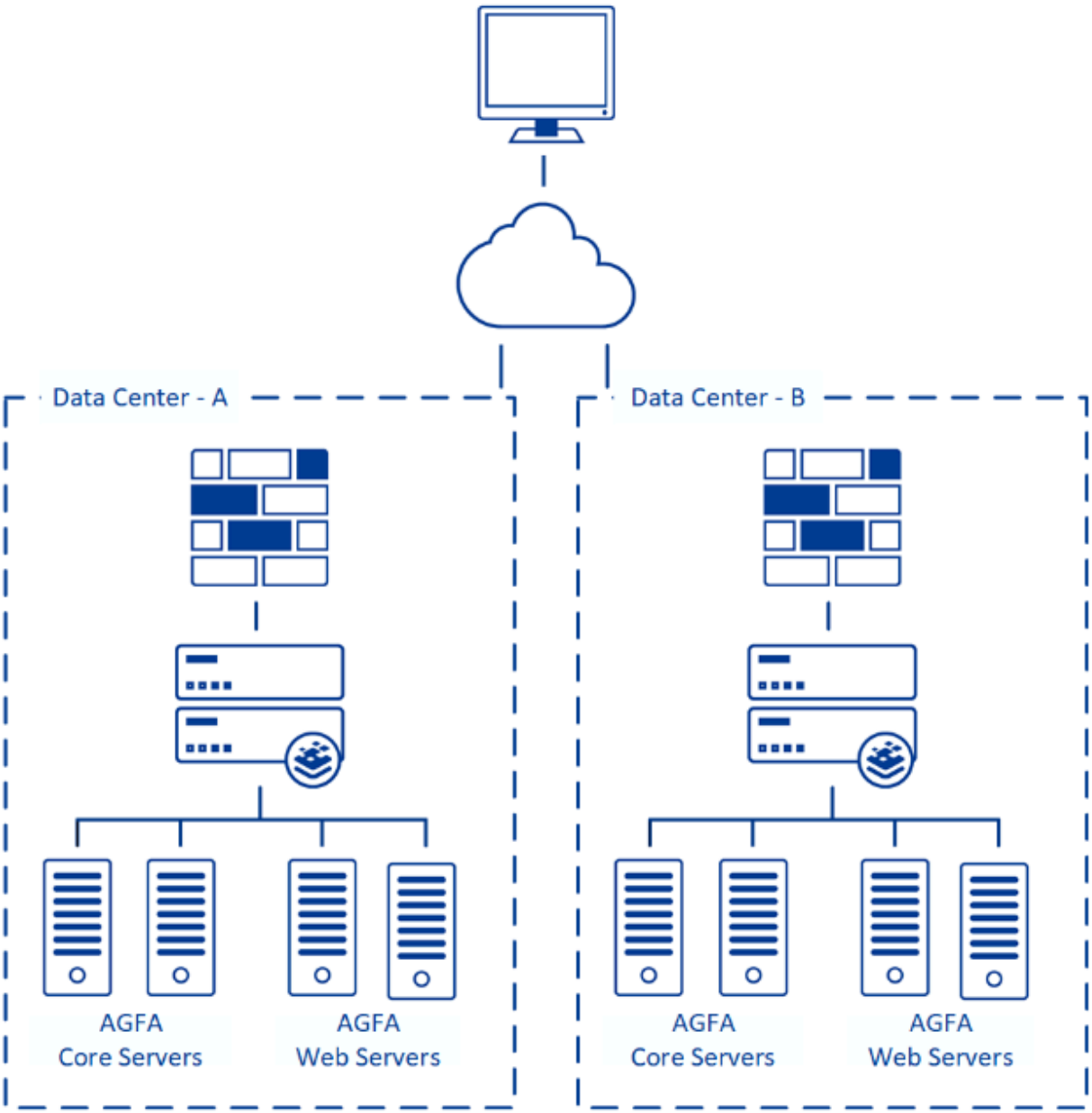
For more information and steps on how to use templates, refer to the Virtual Services and Templates, Feature Description.

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Architecture

AGFA Enterprise Imaging consists of two back end server types, core servers, and web servers.

AGFA's core servers handle requests in various ports categorized as Client ports, DICOM ports, HL7 ports, ARR ports, and Installer ports.


Data Center - A
Data Center - B
AGFA
Core Servers
AGFA
Web Servers
AGFA
Core Servers
AGFA
Web Servers

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Configure the LoadMaster

There are two global settings that we recommend enabling. Refer to the sections below for details.

Contents

- Enable Subnet Originating Requests Globally
- Enable Check Persist Globally

Enable Subnet Originating Requests Globally

It is best practice to enable the **Subnet Originating Requests** option globally.

In a one-armed setup (where the Virtual Service and Real Servers are on the same network/subnet) **Subnet Originating Requests** is usually not needed. However, enabling **Subnet Originating Requests** should not affect the routing in a one-armed setup.

In a two-armed setup where the Virtual Service is on network/subnet A, for example, and the Real Servers are on network B, **Subnet Originating Requests** should be enabled on LoadMasters with firmware version 7.1-16 and above.



When **Subnet Originating Requests** is enabled, the Real Server sees traffic originating from 10.20.20.21 (LoadMaster eth1 address) and responds correctly in most scenarios.

With **Subnet Originating Requests** disabled, the Real Server sees traffic originating from 10.0.0.15 (LoadMaster Virtual Service address on **eth0**) and responds to **eth0** which could cause asymmetric routing.

When **Subnet Originating Requests** is enabled globally, it is automatically enabled on all Virtual Services. If the **Subnet Originating Requests** option is disabled globally, you can choose whether to enable **Subnet Originating Requests** on a per-Virtual Service basis.

To enable **Subnet Originating Requests** globally, follow the steps below:

1. In the main menu of the LoadMaster User Interface (UI), go to **System Configuration > Miscellaneous Options > Network Options**.
2. Select the **Subnet Originating Requests** check box.

Enable Check Persist Globally

It is recommended that you change the **Always Check Persist** option to **Yes – Accept Changes**. Use the following steps:

1. Go to **System Configuration > Miscellaneous Options > L7 Configuration**.
2. Click the **Always Check Persist** drop-down arrow and select **Yes – Accept Changes**.

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Virtual Services

AGFA Enterprise Imaging consists of two back end server types, core servers, and web servers.

AGFA's core servers handle requests in various ports categorized as Client ports, DICOM ports, HL7 ports, ARR ports, and Installer ports.

This step-by-step setup of Virtual Services (VSs) leverages the Progress Kemp application template for **AGFA Enterprise Imaging Exchange**.

The table in each section outlines the settings configured by the application template. You can use this information to manually configure Virtual Services or use the LoadMaster Application Programming Interface (API) and automation tools.

SSL/TLS certificates should be added before creating this Virtual Service. For further information on certificates, refer to the SSL Accelerated Services Feature Description.

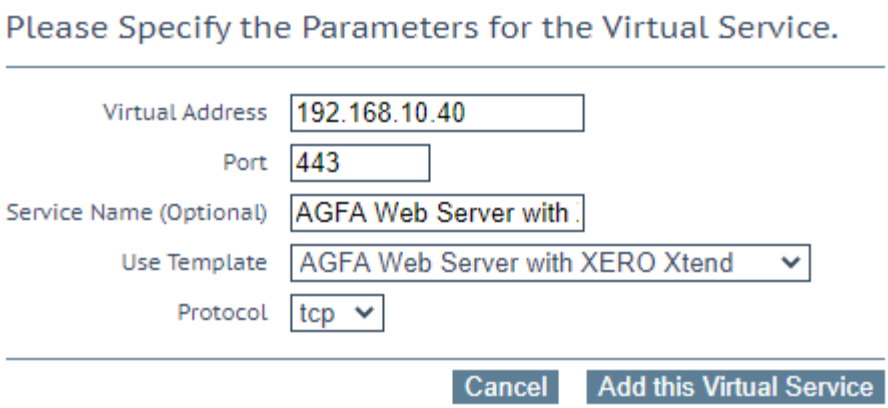
Contents

- Create the AGFA Web Server Virtual Service
- Create the AGFA Core Server Virtual Services

Create the AGFA Web Server Virtual Service

The following are the steps involved and the recommended settings to configure the AGFA Web Server Virtual Service with or without XERO Xtend:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.



2. Type a valid **Virtual Address**.
3. Select the **AGFA Web Server with XERO Xtend** or **AGFA Web Server without XERO Xtend** template in the **Use Template** drop-down list depending on the environment.
4. Click **Add this Virtual Service**.
5. Expand the **SSL Properties** section.
6. Select the certificate to use from **Available Certificates** and click the arrow (**>**) to move it to **Assigned Certificates**.
7. Expand the **SubVSs** section.
8. Click **Modify** on SubVS1 (**Server1**).
9. Expand the **Real Servers** section.
10. Click **Add New**.
11. Type the **Real Server Address**.
12. Confirm that port **443** is entered.
13. Click **Add This Real Server**.
14. Repeat the steps above to add more Real Servers as needed. Each SubVS must only have a single Real Server added.

Note: In some deployments, additional Real Servers will be required. This will require the creation of additional SubVSs and Content Rules to support these environments.

Contents

- Configure AGFA Web Server Content Matching Rules
- Configure AGFA Web Server Header Modification Rules
- AGFA Web Server with XERO Xtend Virtual Service Recommended API Settings (optional)
- AGFA Web Server without XERO Xtend Virtual Service Recommended API Settings (optional)

Configure AGFA Web Server Content Matching Rules

AGFA Web Server configuration requires the use of Content Rules and Header Modification Rules to direct traffic to the appropriate Real Server. These Content Rules include a unique Hash value which must be modified for proper operation:

1. In the main menu of the LoadMaster WUI, go to **Rules & Checking > Content Rules**.
2. Click **Modify** for **HASH_MATCH_Server1**.
3. Replace the **Match String <Enter Hash Value>** with a valid Hash value.
4. Click **Modify Rule**.
5. Repeat the above steps for all **Content Matching Rules**.

Configure AGFA Web Server Header Modification Rules

AGFA Web Server configuration requires the use of Content Rules and Header Modification Rules to direct traffic to the appropriate Real Server. These Content Rules include a unique Hash value which must be modified for proper operation:

1. In the main menu of the WUI, go to **Rules & Checking > Content Rules**.
2. Click **Modify** for **MODIFY_URL_Server1**.
3. Replace the **<Enter Hash Value>** section of the **Match String** with a valid Hash value.
4. Click **Modify Rule**.
5. Repeat the above steps for all **Header Modification Rules**.

AGFA Web Server with XERO Xtend Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

Main Virtual Service	
API Parameter	**API Value**
port	443
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
IdleTime	360
SSLAcceleration	1

Main Virtual Service	
SSLReencrypt	1
TLSType	3
CipherSet	BestPractices
ExtraHdrKey	X-Explicit-Bal
ExtraHdrValue	1
CheckType	https
EnhancedHealthcheck	1
SubVSs	
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
port	443
prot	tcp
CheckType	https
CheckUrl	/wado/status/deployed
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Web Server without XERO Xtend Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

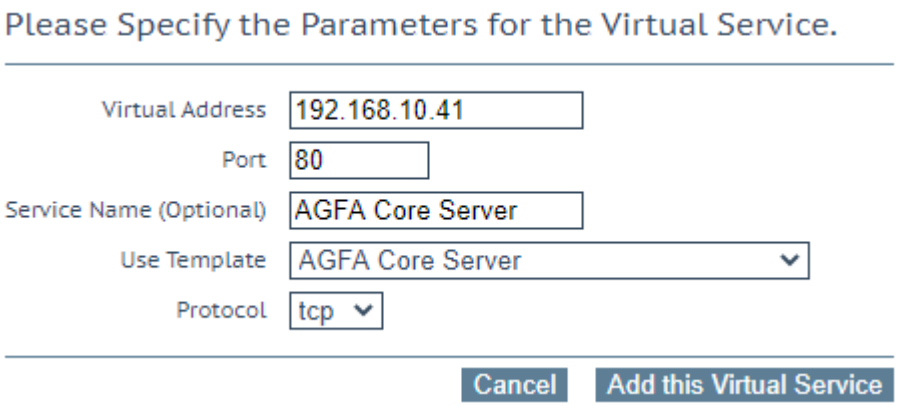
Main Virtual Service	
API Parameter	**API Value**
port	443
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	cookie
Cookie	JSESSIONIDSSO
PersistTimeout	3600
IdleTime	360
SSLAcceleration	1
SSLReencrypt	1
TLSType	3
CipherSet	BestPractices
ExtraHdrKey	X-Explicit-Bal
ExtraHdrValue	1
CheckType	https
EnhancedHealthcheck	1
SubVSs	
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
port	443
prot	tcp

Main Virtual Service	
CheckType	https
CheckUrl	/wado/status/deployed
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

Create the AGFA Core Server Virtual Services

The following are the steps involved and the recommended settings to configure the AGFA Core Server Virtual Service:

1. In the main menu of the LoadMaster WUI, go to **Virtual Services > Add New**.



2. Type a valid **Virtual Address**.
3. Select the **AGFA Core Server** template in the **Use Template** drop-down list.
4. Click **Add this Virtual Service**.

Contents

- Configure AGFA Core Server Virtual Services
- AGFA Core Server Client Port 80 Virtual Service Recommended API Settings (optional)
- AGFA Core Server DICOM 104 Virtual Service Recommended API Settings (optional)
- AGFA Core Server DICOM 110 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 443 Virtual Service Recommended API Settings (optional)
- AGFA Core Server HL7 2310 Virtual Service Recommended API Settings (optional)
- AGFA Core Server HL7 2311 Virtual Service Recommended API Settings (optional)

- AGFA Core Server DICOM 2762 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 4447 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 5222 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 5223 Virtual Service Recommended API Settings (optional)
- AGFA Core Server ARR 6514 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 7443 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 8080 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 8443 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 9080 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 9081 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 10080 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 10123 Virtual Service Recommended API Settings (optional)
- AGFA Core Server Client Port 10124 Virtual Service Recommended API Settings (optional)

Configure AGFA Core Server Virtual Services

There is a total of 19 Virtual Services created from the AGFA Core Server template. These AGFA Core Server Virtual Services require some additional configuration unique to each environment. The following steps need to be followed for all 19 Virtual Services:

1. In the main menu, go to **Virtual Services > View/Modify Services**.
2. Click **Modify** on the relevant Virtual Service.
3. Expand the **SSL Properties** section (only for Virtual Services with **SSL Acceleration** enabled).
4. Select the certificate to use from **Available Certificates** and click the arrow (**>**) to move it to **Assigned Certificates** (only for Virtual Services with **SSL Acceleration** enabled).
5. Expand the **Real Servers** section.
6. Replace **agfa.company.com** with the correct **HTTP/1.1 Host** based on the environment (only for Virtual Services with **HTTP/1.1 Host** enabled).
7. Click **Add New**.
8. Type the **Real Server Address**.
9. Click **Add This Real Server**.
10. Repeat the steps 7 – 9 above to add more Real Servers as needed.

AGFA Core Server Client Port 80 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	80
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	cookie
Cookie	JESSIONID
PersistTimeout	3600
AddVia	5
CheckType	http
CheckUrl	/status
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server DICOM 104 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	104
prot	tcp
VStype	gen
SubnetOriginating	1

API Parameter	API Value
Forcel7	1
Schedule	lc
Persist	none
CheckType	http
CheckPort	80
CheckUrl	/status?type=dicom&port=104
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server DICOM 110 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	110
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
Serverinit	3
CheckType	http
CheckPort	80
CheckUrl	/status?type=dicom&port=110

API Parameter	API Value
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server Client Port 443 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	443
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	cookie
Cookie	JSESSIONID
PersistTimeout	3600
SSLAcceleration	1
SSLReencrypt	1
TLSType	3
CipherSet	BestPractices
AddVia	5
CheckType	https
CheckUrl	/status
CheckHost	<agfa.company.com>

API Parameter	API Value
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server HL7 2310 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	2310
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
IdleTime	86400
CheckType	tcp
CheckPort	2310

AGFA Core Server HL7 2311 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	2311
prot	tcp
VStype	gen
SubnetOrignating	1
Forcel7	1
Schedule	lc
Persist	none
IdleTime	86400
CheckType	tcp
CheckPort	2311

AGFA Core Server DICOM 2762 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	2762
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
CheckType	http
CheckPort	80

API Parameter	API Value
CheckUrl	/status?type=dicom&port=2762
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server Client Port 4447 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	4447
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
Serverinit	3
CheckType	http
CheckPort	80
CheckUrl	/status
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server Client Port 5222 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	5222
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
IdleTime	360
CheckType	tcp
CheckPort	5222

AGFA Core Server Client Port 5223 Virtual Service Recommended API Settings (optional)

AGFA Core Server Client Port 5223 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	5223
prot	tcp

API Parameter	API Value
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
IdleTime	360
CheckType	tcp
CheckPort	5223

AGFA Core Server ARR 6514 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	6514
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
CheckType	tcp
CheckPort	6514

AGFA Core Server Client Port 7443 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	7443
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
Persist	none
IdleTime	360
CheckType	tcp
CheckPort	7443

AGFA Core Server Client Port 8080 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	8080
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1

API Parameter	API Value
Schedule	lc
Persist	cookie
Cookie	JSESSIONID
PersistTimeout	3600
AddVia	5
CheckType	http
CheckPort	8080
CheckUrl	/status
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server Client Port 8443 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	8443
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
PersistTimeout	360
CheckType	https
CheckUrl	/status

API Parameter	API Value
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server Client Port 9080 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	9080
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
PersistTimeout	360
CheckType	http
CheckPort	80
CheckUrl	/status
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server Client Port 9081 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You

can use these settings with scripts and automation tools.

API Parameter	API Value
port	9081
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1
Schedule	lc
PersistTimeout	360
CheckType	http
CheckPort	80
CheckUrl	/status
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server Client Port 10080 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	10080
prot	tcp
VStype	http
SubnetOriginating	1
Forcel7	1

API Parameter	API Value
Schedule	lc
PersistTimeout	360
CheckType	http
CheckPort	80
CheckUrl	/status
CheckHost	<agfa.company.com>
CheckUse1.1	1
CheckUseGet	1

AGFA Core Server Client Port 10123 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	10123
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
PersistTimeout	360
CheckType	tcp
CheckPort	10123

AGFA Core Server Client Port 10124 Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	10124
prot	tcp
VStype	gen
SubnetOriginating	1
Forcel7	1
Schedule	lc
PersistTimeout	360
CheckType	tcp
CheckPort	10124