Installation and Sizing Guidelines for IGEL UMS

The following installation and sizing guidelines are intended to support you with setting up the IGEL Universal Management Suite environment – UMS Server, UMS Console & UMS Web App, database, and, if required, load balancer and ICG instances.

The size and structure of the UMS setup depend mainly on the following criteria:

- Number of devices
- High Availablity
- ICG connection for devices outside of your company network

General Preconditions

The Installation and Sizing Guidelines apply for a standard UMS setup and describe the most common UMS environments. Any individual exceptions or requirements may not be covered by these scenarios.

- System requirements: UMS 6.05 and newer, ICG 2.02 and newer
- **High Availability with IGEL UMS Load Balancers**: All UMS Servers and UMS Load Balancers must reside on **the same VLAN**.
  For High Availability (UMS HA) with IGEL UMS Load Balancers, network traffic must be allowed over UDP broadcast port 6155, and TCP traffic and UDP broadcast traffic over port 61616. For further port configuration, see IGEL UMS Communication Ports.
  Note: IGEL UMS HA installation with IGEL UMS Load Balancers is not supported in cloud environments like Azure / AWS as they do not allow broadcast traffic within their networks. The HA installation without IGEL UMS Load Balancers is, however, supported in cloud environments as of UMS version 6.10.
- UMS Console may be located **inside the same (V)LAN as UMS Servers** (no NAT, no proxies) or **outside the VLAN** with firewalls/routing configured according to IGEL UMS Communication Ports.
- Devices **directly connected to the UMS Server** are in **the same (V)LAN as UMS Servers** (no NAT, no proxies). If there is a firewall, it must be configured according to IGEL UMS Communication Ports.
- Devices **outside of the internal LAN** are connected **via ICG**.
- Devices are **not booted/rebooted frequently** (once a day on average).
- **A maximum of 10 different firmware versions** is managed via UMS.
- UMS backups and exports are **not permanently stored on the UMS server** host.
- In the case of automatic device registration (see Registering Devices Automatically on the IGEL UMS): The **DNS** alias `igelrmserver` or the **DHCP** tag can only point to ONE UMS installation. Therefore, the installation of several separate UMS Servers (without the High Availability Extension) in one network is not recommended.

Recommended Additional Information

IGEL UMS Communication Ports: Find a list with all ports that are relevant for the communication with the UMS.

"Supported Environment": Find in this section in the latest release notes, which servers, clients, and backend databases are supported.

High Availability (HA): Find useful how-tos and the reference guide around your HA installation.

IGEL Cloud Gateway: Find how-tos, the reference guide, and additional information concerning the management of endpoints outside the company network.

- IGEL UMS Installation Types & Diagrams(see page 4)
- Performance Optimizations(see page 17)

IGEL UMS Installation Types & Diagrams

The following installation and sizing guidelines are intended to support you with setting up the IGEL Universal Management Suite environment – UMS Server, UMS Console & UMS Web App, database, and, if required, load balancer and ICG instances.

General Installation Recommendations
For small installations, a single UMS Server instance (standard UMS) with an embedded database is usually sufficient. If required, a single-instance installation can be easily extended anytime to a Distributed UMS installation by installing additional servers (and in the case of an embedded database, by switching preliminarily to an external data source).
Large installations should use either the UMS High Availability or the Distributed UMS (preferable for new installations, e.g. because you do not have to configure additional firewall exclusions). For large installations, it is also recommended to use DNS-Round-Robin load balancing or IGEL Cloud Gateway.
For more information, see Installing a UMS server(see page 4).

Installation Size	#Devices	#UMS Server Host (+ Load Balancer)	UMS Server	UMS Console Standalone	#Load Balancer Standalone	Load Balancer Standalone	Database**	ICG
S	< **5.000**	**1 server**	8 GB RAM (UMS Web App + 1 GB) 4 CPUs 25 GB free disk space	**Optional*** 3 GB RAM 2 CPUs 1 GB HDD			Embedded database	**1 ICG instance per 2,500 devices** **Server generally:** 8 GB RAM 2 CPUs 20 GB HDD **Only ICG service:** 4 GB RAM 2 CPUs 2 GB HDD
M	< **15.000**	**1 server**	8 GB RAM (UMS Web App + 1 GB) 4 CPUs 25 GB free disk space	**Optional*** 3 GB RAM 2 CPUs 1 GB HDD			**External database** 10 GB	
M / S (HA or Distributed UMS)	< **15.000**	**2 servers** **2 load balancers**	9 GB RAM (Web App +1GB) 6 CPUs 25 GB HDD	**Optional*** 3 GB RAM 2 CPUs 1 GB HDD			**External database** 10 GB	
L (HA or Distributed UMS)	< **50.000**	**2 servers** **2 load balancers**	6 GB RAM*** (Web App +1GB) 4 CPUs 25 GB HDD	**Mandatory** 3 GB RAM 2 CPUs 1 GB HDD			**External database** 10 GB	
XL (HA or Distributed UMS)***	< **300.000**	**Up to 6 servers** (1 server / 50,000 devices)	9 GB RAM (Web App +1GB) 6 CPUs 25 GB HDD	**Mandatory** 6 GB RAM 4 CPUs 1 GB HDD	Up to 3 Load Balancer (1 LB / 3 Server)	4 GB RAM 4 CPUs 2 GB HDD	**External database** 20 GB	

* UMS Console can be installed on UMS Server host.

** Follow the recommendation of the external database system on RAM and CPU.

*** RAM and CPU requirements are less than in the case of **M / S (HA)** installation since the UMS Console is installed on a separate host machine (**UMS Console Standalone** = **Mandatory**).

**** General recommendation: 1 UMS Server per 50,000 devices, 1 load balancer for 3 UMS Servers.

- Small Environment: UMS S(see page 7)
- Medium Environment: UMS M(see page 9)
- Small and Medium Environments: UMS M/S (HA)(see page 11)
- Large Environment: UMS L (HA)(see page 13)
- Extra Large Environment: UMS XL (HA)(see page 15)

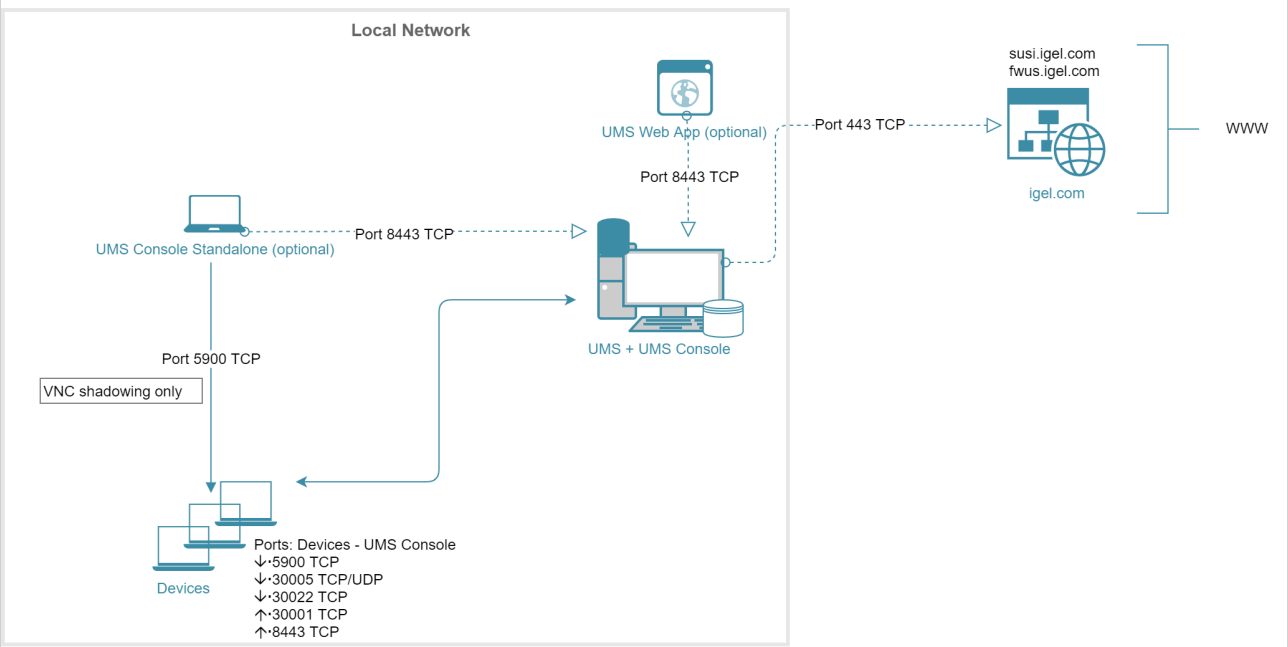
Small Environment: UMS S

Small Size UMS Installation (<5k Devices) or Demo/POV Environment with an Embedded Database

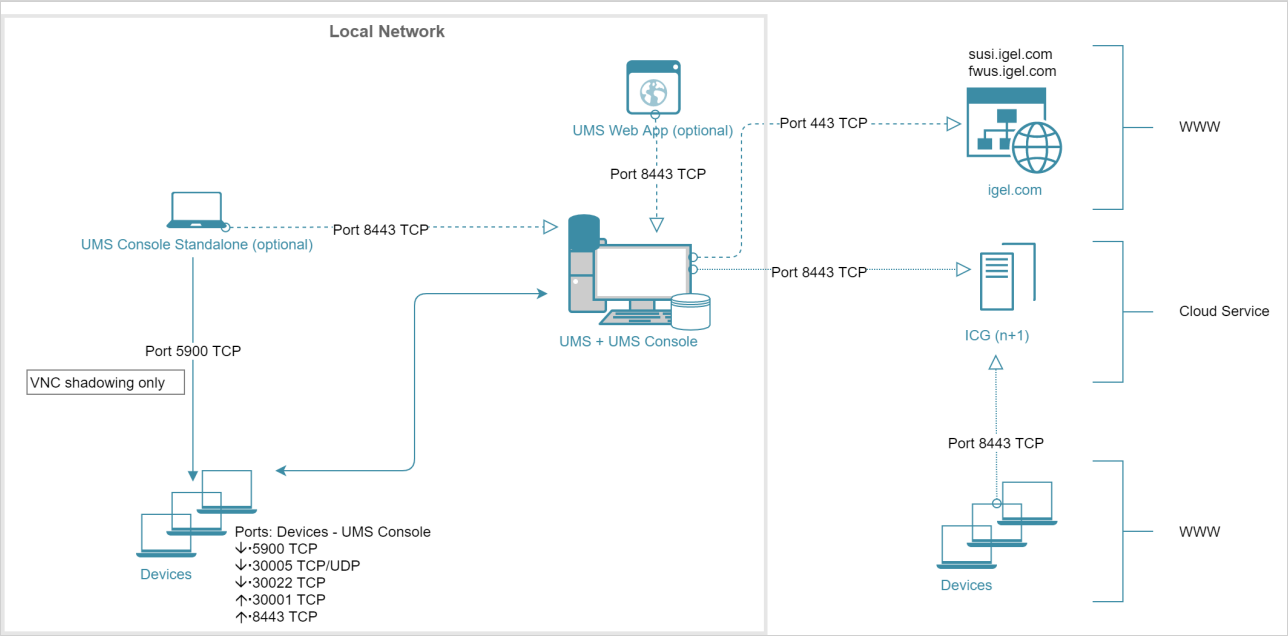
Installation Size	#Devices	#UMS Server Host	UMS Server	UMS Console Standalone	#Load Balancer Standalone	Load Balancer Standalone	Database	ICG
S	< **5.000**	**1 server**	8 GB RAM (UMS Web App + 1 GB) 4 CPUs 25 GB free disk space	**Optional*** 3 GB RAM 2 CPUs 1 GB HDD			Embedded database	**1 ICG instance per 2,500 devices** **Server generally:** 8 GB RAM 2 CPUs 20 GB HDD **Only ICG service:** 4 GB RAM 2 CPUs 2 GB HDD

***** UMS Console can be installed on UMS Server host.

Architecture: Small Environment



Architecture: Small Environment + ICG in Cloud



Medium Environment: UMS M

Medium Size UMS Installations (up to ~15k Devices); No High Availability

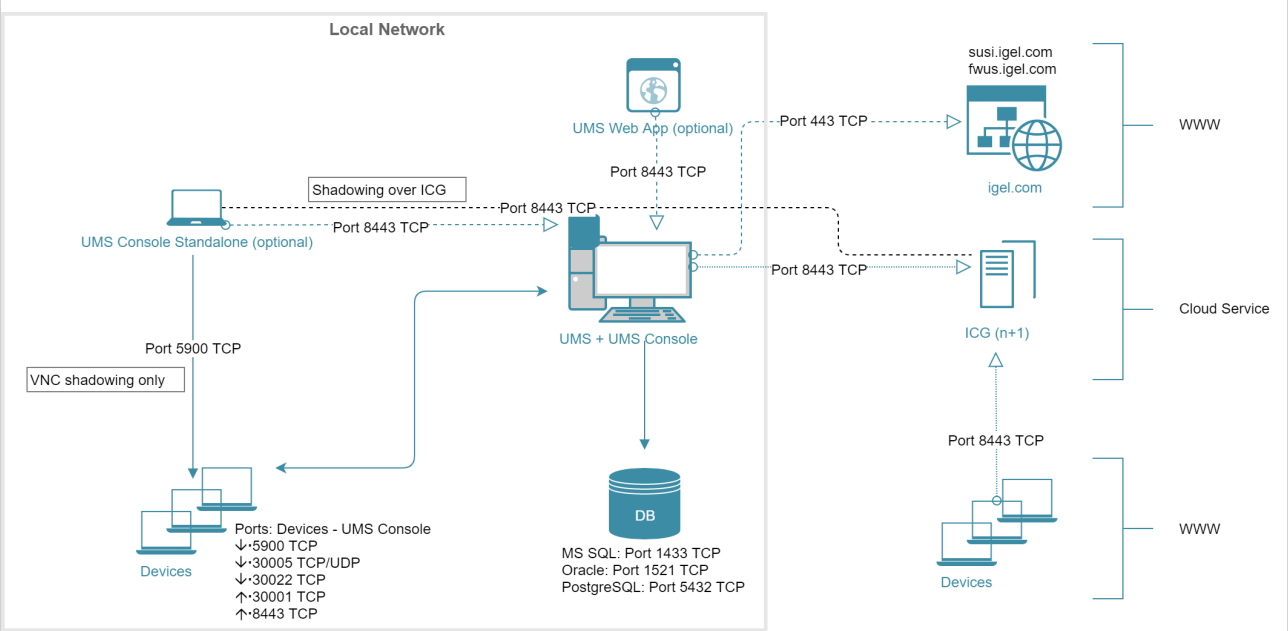
Installation Size	#Devices	#UMS Server Host	UMS Server	UMS Console Standalone	#Load Balancer Standalone	Load Balancer Standalone	Database**	ICG
M	< **15.000**	**1 server**	8 GB RAM (UMS Web App + 1 GB) 4 CPUs 25 GB free disk space	**Optional*** 3 GB RAM 2 CPUs 1 GB HDD			**External database** 10 GB	**1 ICG instance per 2,500 devices** **Server generally:** 8 GB RAM 2 CPUs 20 GB HDD **Only ICG service:** 4 GB RAM 2 CPUs 2 GB HDD

***** UMS Console can be installed on UMS Server host.

****** Follow the recommendation of the external database system on RAM and CPU.

For High Availability, see Small and Medium Environments: UMS M/S (HA)(see page 11).

Architecture: Medium Environment + ICG


Local Network
susi.igel.com
fwus.igel.com
UMS Web App (optional)
Port 443 TCP
WWW
igel.com
Port 8443 TCP
Shadowing over ICG
Port 8443 TCP
Port 8443 TCP
UMS Console Standalone (optional)
Port 8443 TCP
Cloud Service
ICG (n+1)
UMS + UMS Console
Port 5900 TCP
VNC shadowing only
Port 8443 TCP
DB
Devices
Ports: Devices - UMS Console
↓·5900 TCP
↓·30005 TCP/UDP
↓·30022 TCP
↑·30001 TCP
↑·8443 TCP
MS SQL: Port 1433 TCP
Oracle: Port 1521 TCP
PostgreSQL: Port 5432 TCP
Devices
WWW

Small and Medium Environments: UMS M/S (HA)

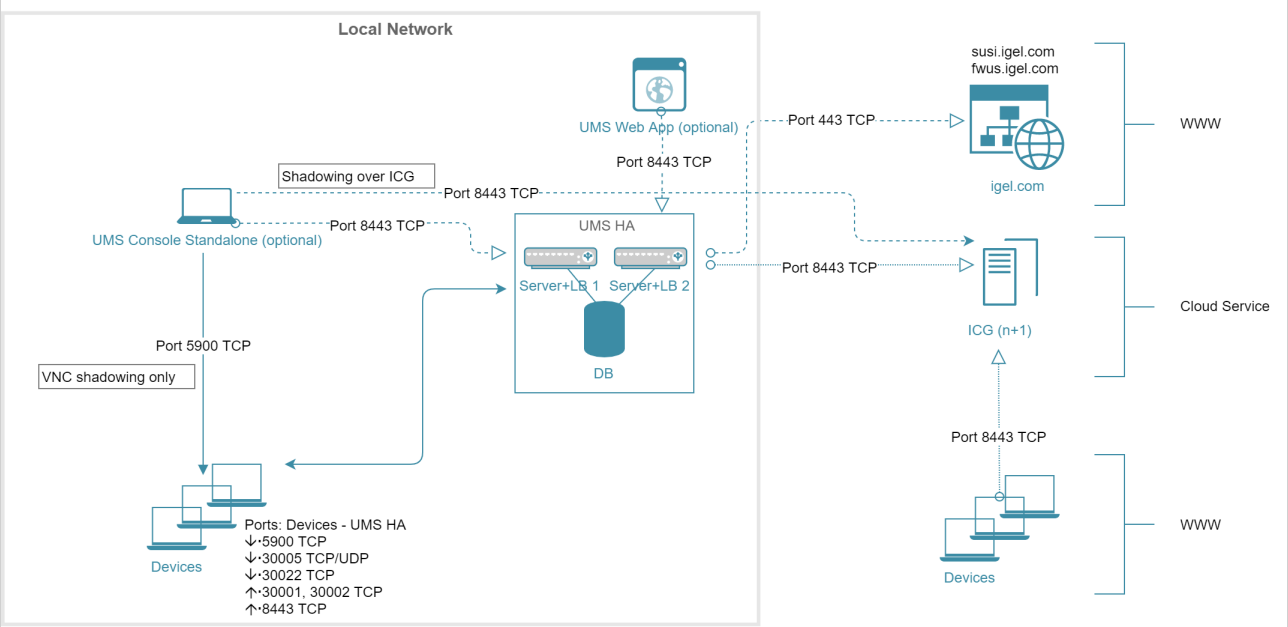
Small and Medium Size UMS Installations (up to ~15k devices); High Availability

Installation Size	#Devices	#UMS Server Host (+ Load Balancer)	UMS Server	UMS Console Standalone	#Load Balancer Standalone	Load Balancer Standalone	Database**	ICG
M / S (HA or Distributed UMS)	< **15.000**	**2 servers** **2 load balancers**	9 GB RAM (Web App +1 GB) 6 CPUs 25 GB HDD	**Optional*** 3 GB RAM 2 CPUs 1 GB HDD			**External database** 10 GB	**1 ICG instance per 2,500 devices** **Server generally:** 8 GB RAM 2 CPUs 20 GB HDD **Only ICG service:** 4 GB RAM 2 CPUs 2 GB HDD

***** UMS Console can be installed on UMS Server host.

****** Follow the recommendation of the external database system on RAM and CPU.

Architecture: Small and Medium Environment (HA) + ICG


Local Network
UMS Web App (optional)
Port 8443 TCP
Port 443 TCP
susi.igel.com
fwus.igel.com
igel.com
WWW
Shadowing over ICG
Port 8443 TCP
UMS Console Standalone (optional)
Port 8443 TCP
UMS HA
Server+LB 1
Server+LB 2
DB
Port 8443 TCP
ICG (n+1)
Cloud Service
Port 5900 TCP
VNC shadowing only
Port 8443 TCP
Devices
Ports: Devices - UMS HA
↓·5900 TCP
↓·30005 TCP/UDP
↓·30022 TCP
↑·30001, 30002 TCP
↑·8443 TCP
Devices
WWW

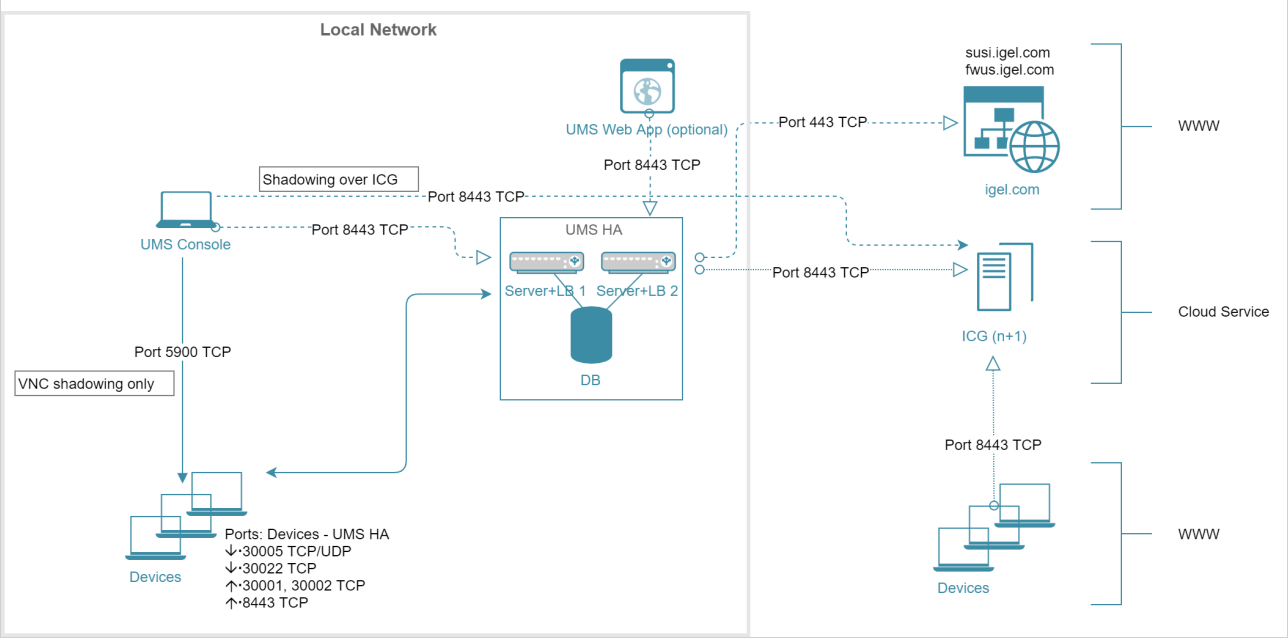
Large Environment: UMS L (HA)

Large UMS Installations with up to 50k Devices; High Availability + ICG

Installation Size	#Devices	#UMS Server Host (+ Load Balancer)	UMS Server	UMS Console Standalone	#Load Balancer Standalone	Load Balancer Standalone	Database*	ICG
L (HA or Distributed UMS)	**< 50.000**	**2 servers** **2 load balancers**	6 GB RAM (Web App +1GB) 4 CPUs 25 GB HDD	**Mandatory** 3 GB RAM 2 CPUs 1 GB HDD			**External database** 10 GB	**1 ICG instance per 2,500 devices** **Server generally:** 8 GB RAM 2 CPUs 20 GB HDD **Only ICG service:** 4 GB RAM 2 CPUs 2 GB HDD

***** Follow the recommendation of the external database system on RAM and CPU.

Architecture: Large Environment (HA) + ICG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UMS Web App (optional)
Port 443 TCP
susi.igel.com
fwus.igel.com
WWW
igel.com
Port 8443 TCP
Shadowing over ICG
Port 8443 TCP
UMS Console
Port 8443 TCP
UMS HA
Server+LB 1
Server+LB 2
DB
Port 8443 TCP
ICG (n+1)
Cloud Service
Port 5900 TCP
VNC shadowing only
Port 8443 TCP
Devices
Ports: Devices - UMS HA
↓·30005 TCP/UDP
↓·30022 TCP
↑·30001, 30002 TCP
↑·8443 TCP
Devices
WWW

Extra Large Environment: UMS XL (HA)

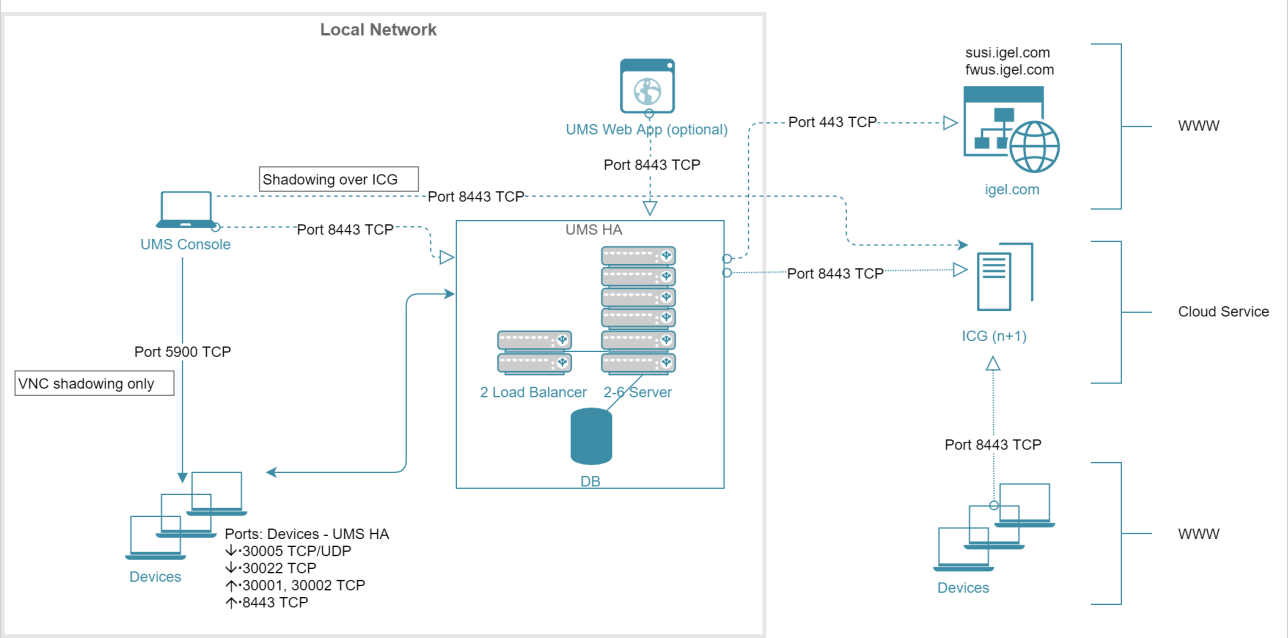
Extra Large UMS Installations with up to 300k Devices; High Availability + ICG

Installation Size	#Devices	#UMS Server Host	UMS Server	UMS Console Standalone	#Load Balancer Standalone	Load Balancer Standalone	Database*	ICG
XL (HA or Distributed UMS)**	< **300.000**	**Up to 6 servers** (1 server / 50,000 devices)	9 GB RAM (Web App +1GB) 6 CPUs 25 GB HDD	**Mandatory** 6 GB RAM 4 CPUs 1 GB HDD	Up to 3 load balancers (1 load balancer / 3 servers)	4 GB RAM 4 CPUs 2 GB HDD	**External database** 20 GB	**1 ICG instance per 2,500 devices** **Server generally:** 8 GB RAM 2 CPUs 20 GB HDD **Only ICG service:** 4 GB RAM 2 CPUs 2 GB HDD

***** Follow the recommendation of the external database system on RAM and CPU.

****** General recommendation: 1 UMS Server per 50,000 devices, 1 load balancer for 3 UMS Servers.

Architecture: Extra Large Environment (HA) + ICG


Local Network
UMS Web App (optional)
Port 443 TCP
susi.igel.com
fwus.igel.com
WWW
Port 8443 TCP
Shadowing over ICG
Port 8443 TCP
igel.com
UMS Console
Port 8443 TCP
UMS HA
Port 8443 TCP
Cloud Service
ICG (n+1)
Port 5900 TCP
VNC shadowing only
2 Load Balancer
2-6 Server
DB
Port 8443 TCP
Devices
Ports: Devices - UMS HA
↓·30005 TCP/UDP
↓·30022 TCP
↑·30001, 30002 TCP
↑·8443 TCP
Devices
WWW

Performance Optimizations

Data Sizing

- The number of registered firmware versions has the **largest impact** on the size of the database. (Listed in UMS Console under **Misc > Firmware Statistics**)
- The number of devices or profiles has a **minor impact**.
- Average size per...
  - Firmware configuration: ~15 MB
  - Profile (depends on the number of active parameters): ~100 kB
  - Device: ~100 kB
- Reserve 500 MB up to 1 GB for database transaction logs of excessive database calls like **Remove unused Firmware**. Please note that the usage depends on the database system used.

Latencies

If you are struggling with long-distance connections and high latency, please consider the following recommendations:

- Minimize latency between...
  - Database <-> UMS Server: <= 20 ms
  - Several UMS Servers: <= 50 ms
  - Load balancer <-> UMS Server: <= 50 ms
- High latency between the database and the UMS Server has a **huge impact** on the performance. The communication between the device and the UMS Console will slow down, the UMS Console itself will become lazy.
- High latency between the device and the UMS Server has **little impact** on overall performance.

Performance Optimizations

- **UMS logs:**
  Use administrative tasks to automatically clean up logs (logging data, job execution data, execution data of administrative tasks, process events, asset information history) or remove old UMS log files (`/rmguiserver/logs`) when storage space runs out.
- **Firmware:**
  Remove unused firmware regularly.
- **Embedded database only:**
  - Optimize database regularly (UMS Administrator application, e.g. once a month)
  - Check for free storage space and expand the storage size if necessary (keep at least 1 GB free at all times)
- **Number of devices:**
  - If the device count is high (>10k) and overall performance is low, increase UMS Server and UMS Console memory. See How to Configure Java Heap Size for the UMS Server and How to Configure Java Heap Size for the UMS Console.

    - Avoid too many devices (>5k) in one folder.
- **Assignments:**
  Keep the number of assignments per device (direct and indirect) at a low level (<25).
- **Administrative tasks and jobs:**
  The more administrative tasks and jobs are created, the more heap is "eaten up", so it may be necessary to increase UMS Server memory. See How to Configure Java Heap Size for the UMS Server.
- **Default directory rules:**
  Do not use default directory rules with the **Apply rule when device boots** option unless they are required.
- **Concurrent device requests:**
  If you are experiencing problems with many concurrent device requests (delays in configuration deployment or logging on to the device), open the UMS Console and use the options under **UMS Administration > Global Configuration > Device Network Settings > Device Requests** (thread and queue size) to control the throughput of the device requests. Contact support for recommendations.

Limitations: UMS HA

- Device actions that are manually triggered in the UMS Console are performed by **one UMS Server** (the one the UMS Console is currently connected to); there is no load balancing for these actions.