

Smart Building Manager

System Architecture Guide



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Chapter 1. Scope

This document gives you a brief overview about the major design aspects of the SBM architecture.

The purpose of the document is to give planners and partners an high level overview about the general blueprints of the different architecture scenarios.

The major aspects are

- interfaces
- database usage
- fail over and redundancy handling

Chapter 2. Executive Summary

The following list contains the primary services and components of the SBM application:

- SBM Web Portal (Frontend)
- Backend services
- Relational database services
- Services for the different communication interfaces

The following typical scenarios are supported:

- On-premise installation
- Basic cloud support
- Fail-over environment for High Availability environment

Chapter 3. On-Premise Installation

3.1. Option 1: Embedded MQTT Broker

The following diagram shows the standard installation scenario using an on-premise configuration with embedded MQTT Broker.

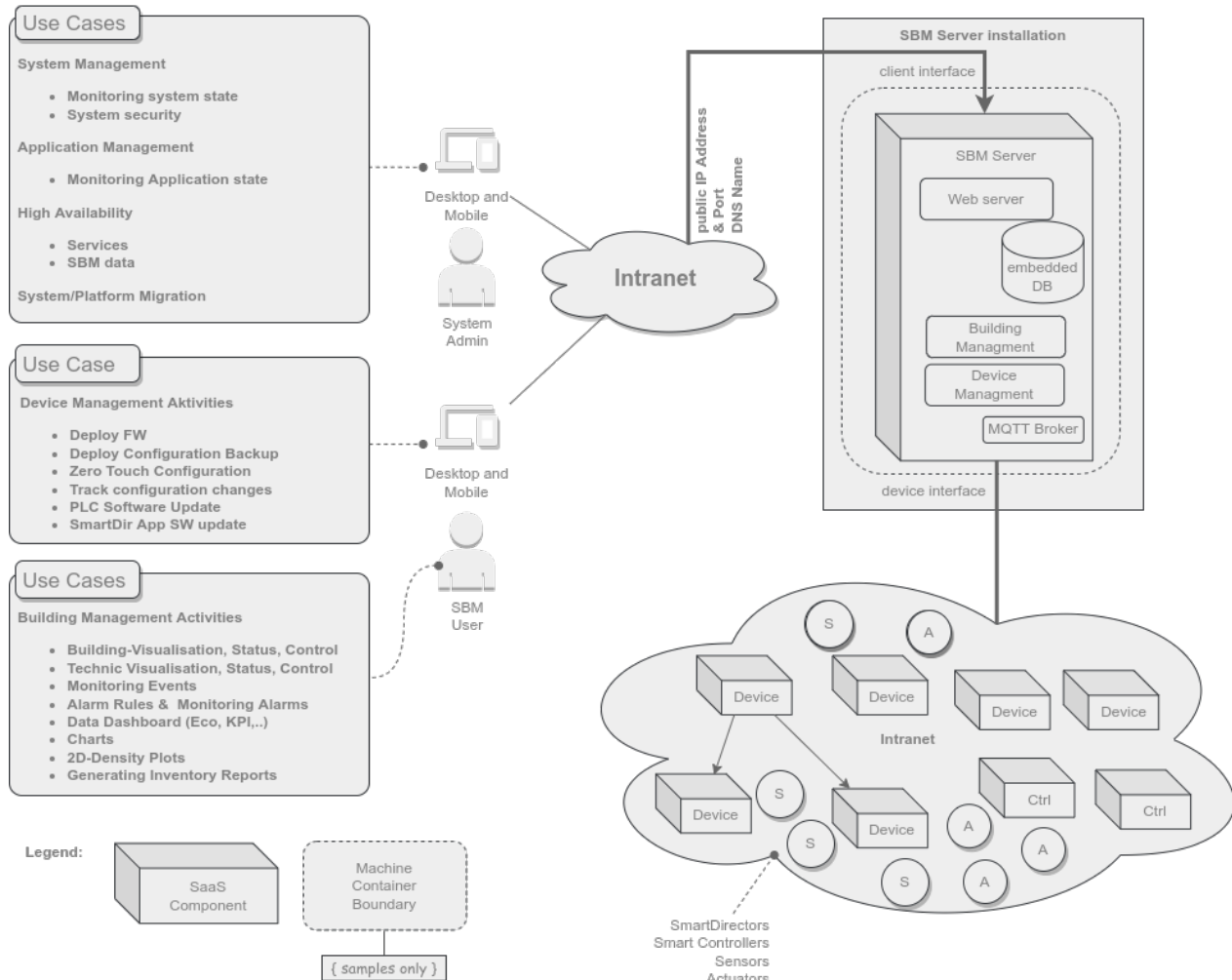


Figure 1. Standard Installation On-Premise Scenario (MQTT Broker Embedded)

Characteristics

The characteristic are:

- Using an embedded relational database to store information about
 - devices
 - data values
 - events
 - users
- Embedded Web server

- Embedded MQTT Broker

Primary usage scenario

- Simple roll-out
- Most secure when decoupled from the internet
- Best for small and mid-size building

3.2. Option 2: External MQTT Broker

The following diagram shows the standard installation scenario using an on-premise configuration with external MQTT Broker.

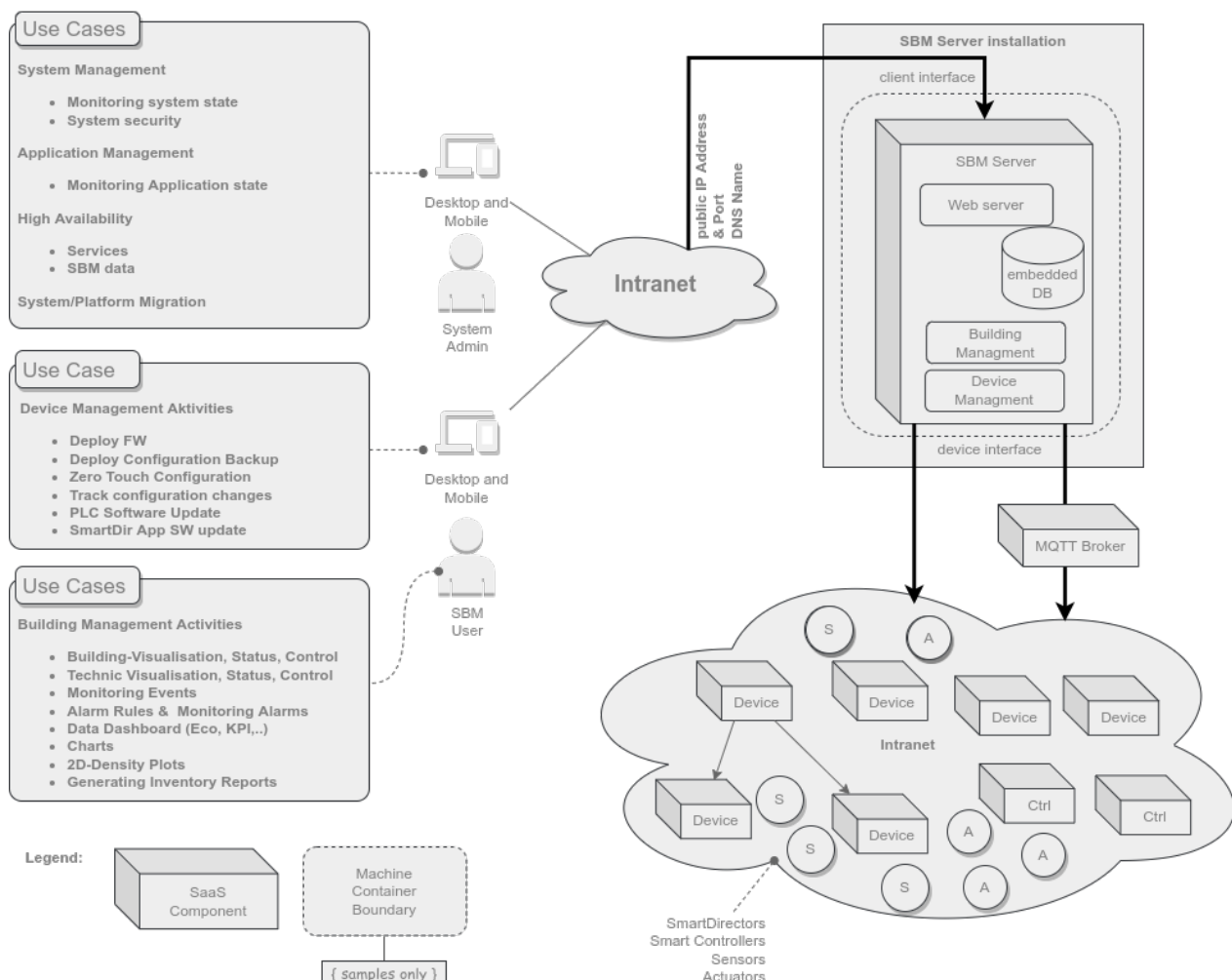


Figure 2. Standard Installation On-Premise Scenario (MQTT Broker Extern)

Characteristics

The characteristic are:

- Using an embedded relational database to store information about
 - devices
 - data values

- events
- users
- Embedded Web server
- External MQTT Broker

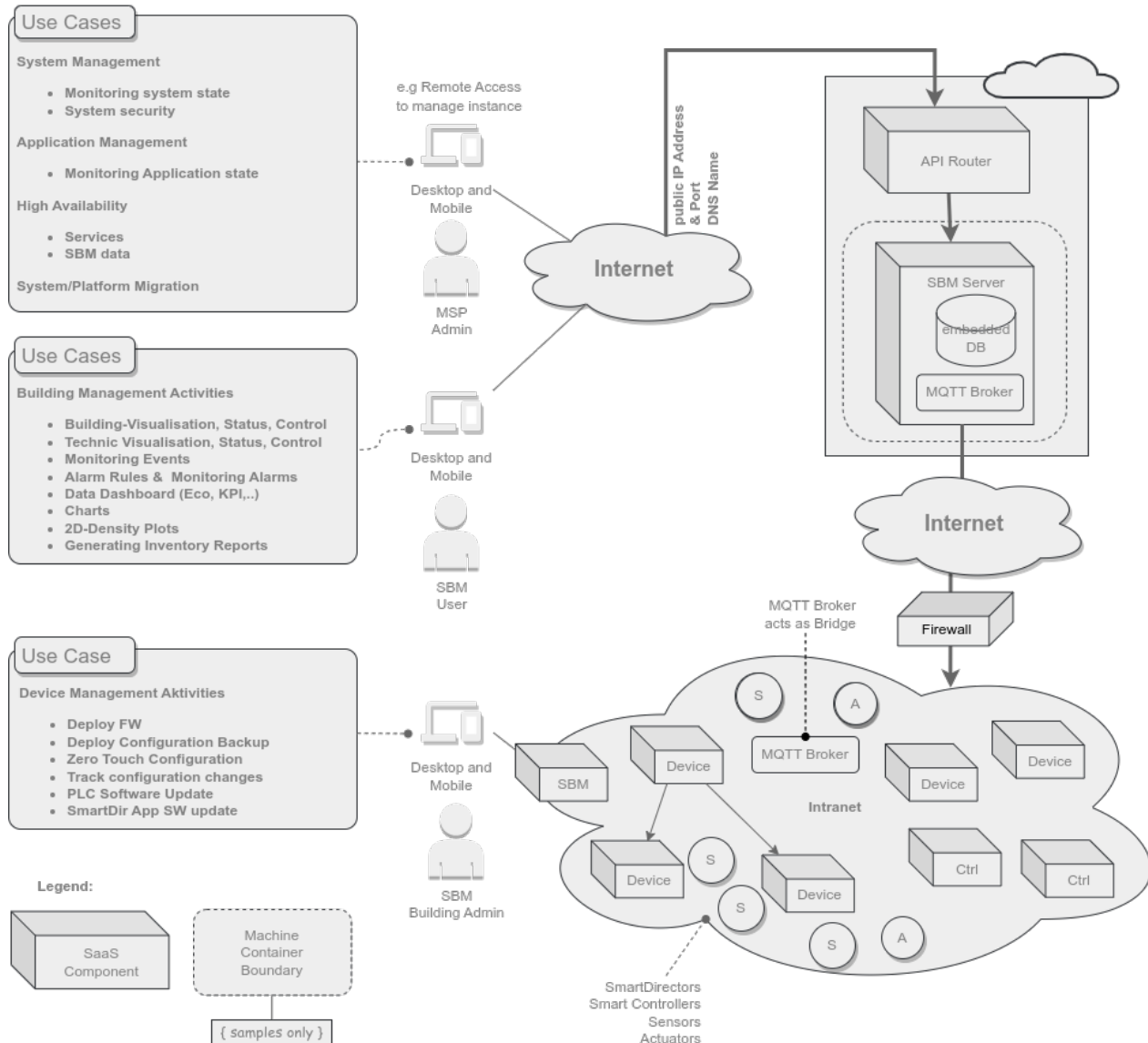
Primary usage scenario

- Simple roll-out
- Most secure when decoupled from the internet
- Best for mid-size and large buildings

Chapter 4. Cloud Installation

4.1. Option 1: Embedded MQTT Broker

The following diagram shows the cloud installation scenario using with embedded MQTT Broker.



Note

The on-premise server is still required for device management functions!

Characteristics

The characteristic are:

- Using an embedded relational database to store information about
 - devices

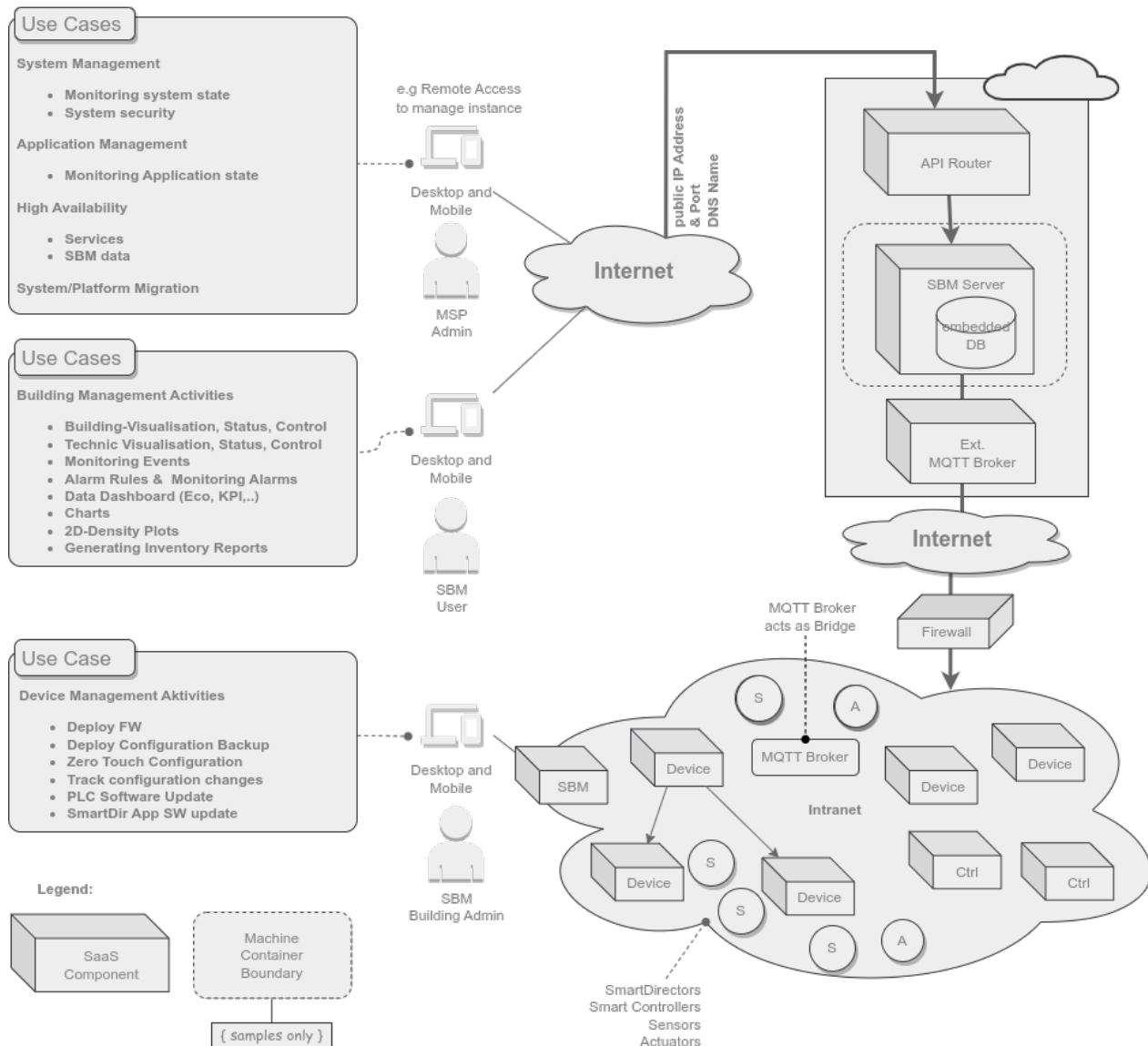
- data values
- events
- users
- Embedded Web server
- Embedded MQTT Broker

Primary usage scenario

- Simple roll-out
- Most secure when decoupled from the internet
- Best for mid-size and large buildings
- Using a managed server instance

4.2. Option 2: External MQTT Broker

The following diagram shows the cloud installation scenario using with external MQTT Broker.



Characteristics

The characteristic are:

- Using an embedded relational database to store information about
 - devices
 - data values
 - events
 - users
- Embedded Web server

- External MQTT Broker for scalability reasons (load balancing)

The MQTT Broker can be located on the same machine as the SBM Server or on a different machine.

Primary usage scenario

- Simple roll-out
- Most secure when decoupled from the internet
- Best for mid-size and large buildings
- Using a managed server instance

Chapter 5. High Availability Operation

The following diagram shows the standard installation scenario for an fail-over scenario to provide a high availability environment.

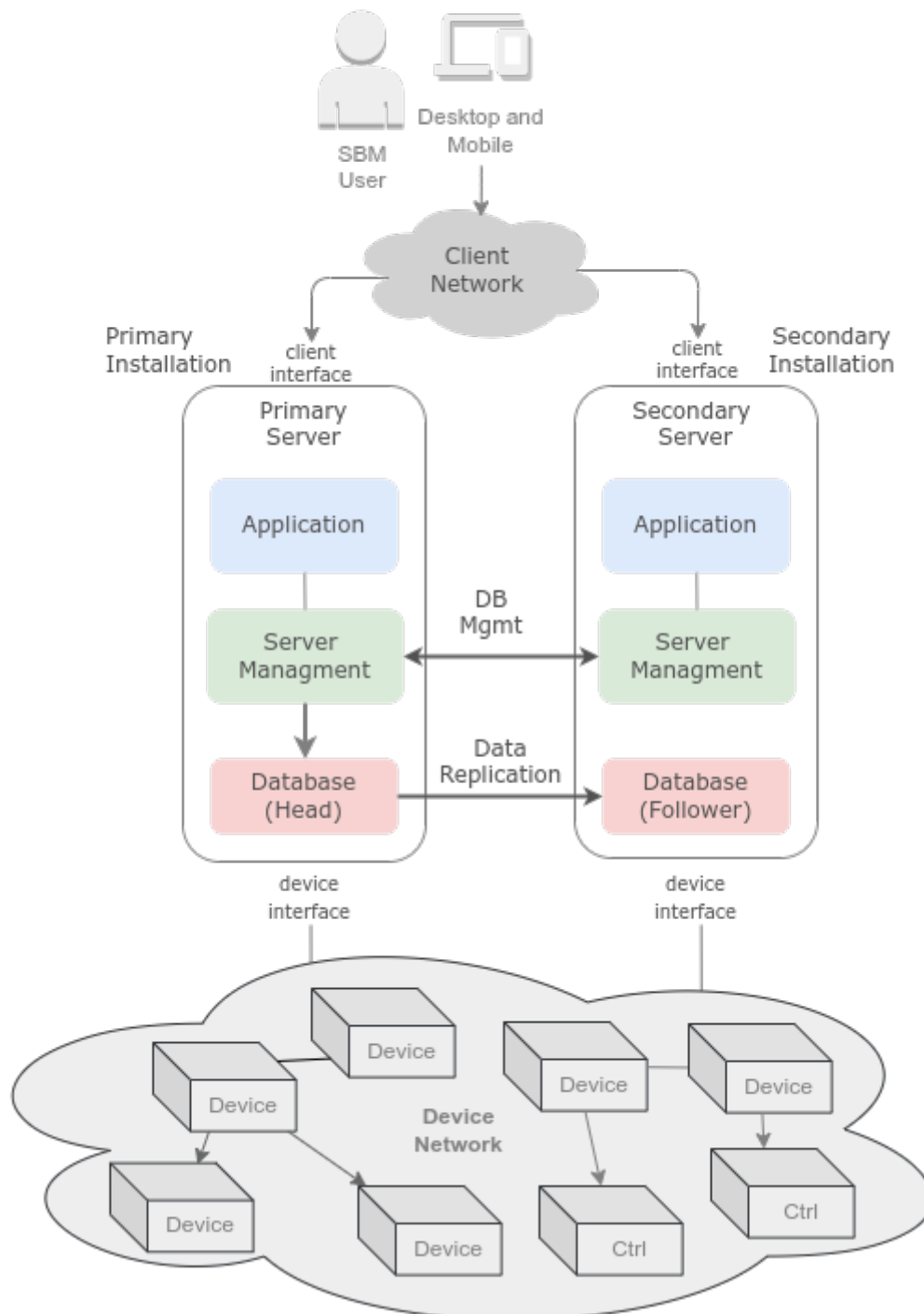


Figure 5. High Availability Operation Scenario

Database replication is available via Server Manager (tab Database Replication) or via web client with the app "Server Configuration" (Server Settings > Database Replication)

Characteristics

The characteristic are:

- Two separate server installations are required:
 - Primary server
 - Secondary server
- Database content is replicated from primary to secondary server
- Client user needs to re-connect to continue the work after fail-over operation is finished.

Primary usage scenario

- Experienced system administrator skills
- Reduce the MTBF time (Mean Time Between Failure)

Chapter 6. Design Guidelines

The following list contains the main topics that have to be considered when defining the installation scenario:

- Network design
- Performance and Scalability
- Security
- High Availability

6.1. Network Design

The network design is important for the device management to be able to

- discover the edge devices
- apply FW update
- apply configuration backup / restore
- discover SmartDirectors
- apply configuration script

Therefore the major topics are:

- Define IP addressing schema like
 - IPv4 addresses
 - IPv6 addresses
 - VLAN settings
 - Broadcast and Multicast settings

IMPORTANT

Take care about firewall settings!

6.2. Performance and Scalability

Take care about:

- Number of devices
- estimate the load for
 - polling status information from Edge Devices (Number of polled devices/minute)
 - catching MQTT topics (published topics/second)

6.3. Security

Take care about:

- identify the different user roles
- defining the different access levels for each user role
- privileges for adding and dropping user accounts
- using a RADIUS server

6.4. High Availability

- Establish a process to monitor the system where the SBM is running. You may use open source tools like Influx and Telegraf to minimize the administrative overhead. The following topics are in scope of the system monitoring:
- CPU load
- Memory load
- Disk usage

Note

Ask your sales representative for a document to setup Influx and Telegraf for the SBM Server Monitoring.

Chapter 7. Appendix: Network Interfaces

The figure below depicts the different interfaces of an SBM server and show the options for the different integration scenarios with 3rd party products including open source tools.

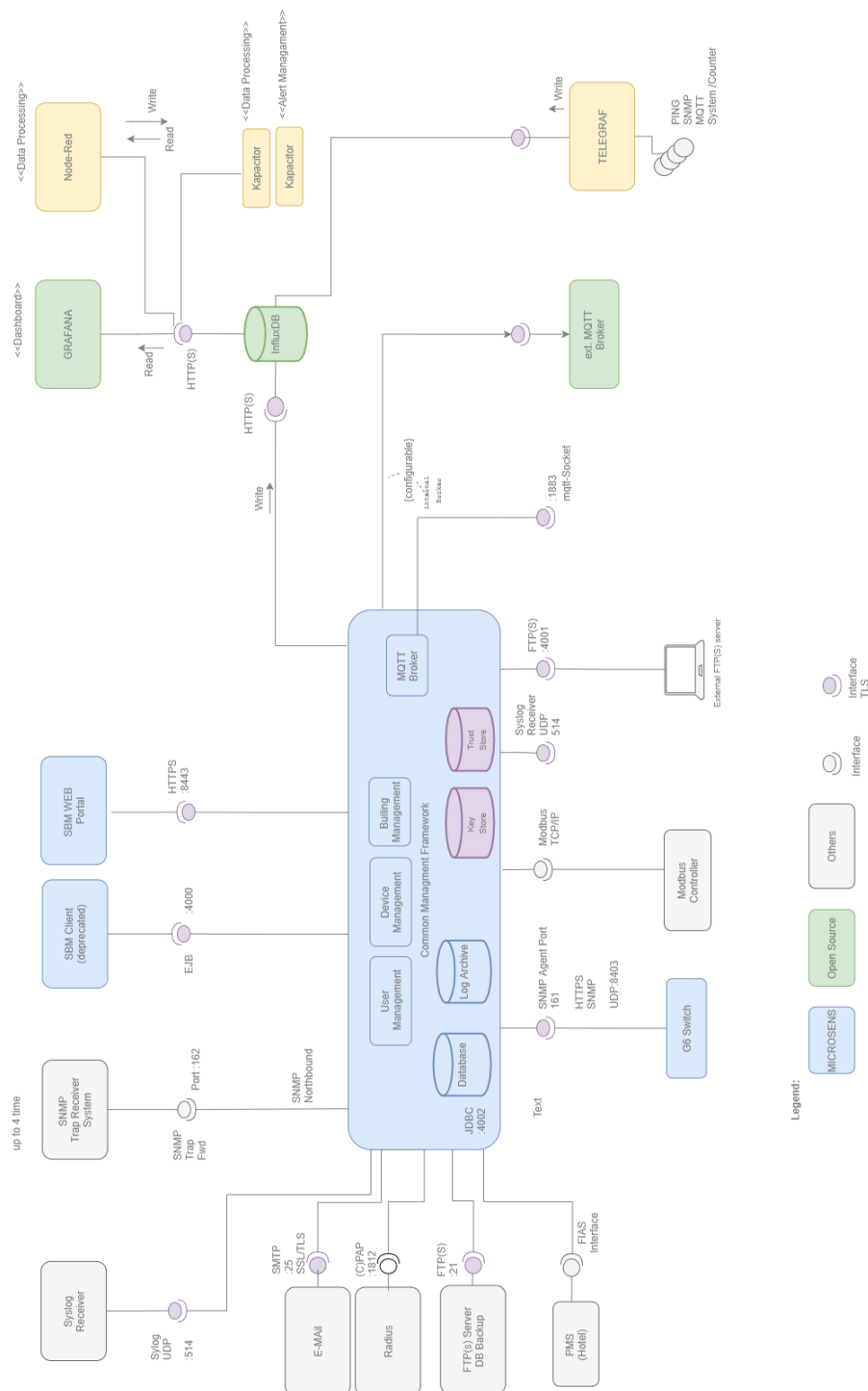


Figure 6. Network Interfaces and integration context

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