

SIEMENS

SIMATIC RTLS

Localization systems

SIMATIC RTLS Replication

Application manual

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indicates that death or severe personal injury will result if proper precautions are not taken.
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 WARNING
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indicates that death or severe personal injury may result if proper precautions are not taken.

 CAUTION
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indicates that minor personal injury can result if proper precautions are not taken.
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NOTICE

indicates that property damage can result if proper precautions are not taken.
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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Table of contents

1	General	5
1.1	Target group and limits.....	5
2	Overview	5
2.1	Term "Replication"	5
2.2	System architecture with replication.....	5
2.3	Operating principle	6
2.4	Replicated data.....	7
2.4.1	Transponder information.....	7
2.4.2	Transponder parameters	8
2.4.3	Transponder groups.....	9
3	Installation	10
3.1	Removing a server from the network	10
4	Configuration	11
4.1	Commissioning, starting and operating the replication service.....	12
5	Updates	12

1 General

1.1 Target group and limits

This manual explains the structure and functioning of the replication service as well as its administration. Installation is not covered here, because it takes place during the installation of the Locating Manager. You require an appropriate license to operate the replication service. This manual applies to Locating Manager.

2 Overview

2.1 Term "Replication"

Replication refers to saving the same data multiple times, usually in different locations, and the synchronization of these data sources.

2.2 System architecture with replication

Locating Manager replication enables the synchronization of data between multiple Locating Manager localization servers. For this purpose, every installation has a replication server. This is a component of the "RTLS_LM_CommunicationServices".

The following system image represents the configuration with server components for two locations:

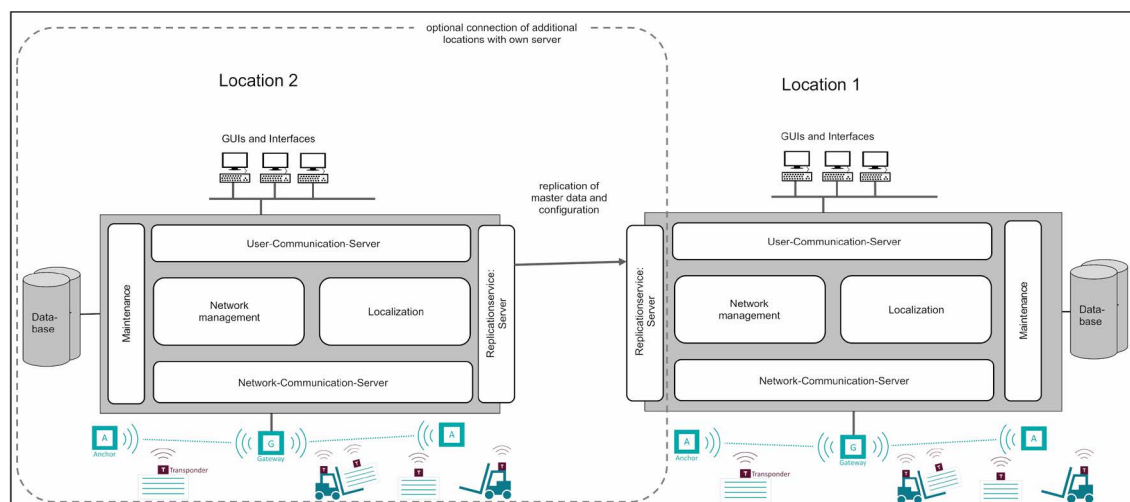


Figure 1 Software architecture of the Locating Manager with two localization servers at separate locations

In addition to the two localization servers represented in figure 1, it is also possible to use additional localization servers. Synchronization is not affected by the type of connections, the number or the degree of networking. However, for performance reasons, it is recommended that you keep the number of connections to a minimum. No intelligent routing takes place.

2.3 Operating principle

The replication service is used to synchronize the base data of different servers. As a rule, changes and networks are transferred to the other servers by the network and adapted there.

If the connection between the servers fails, changes are stored locally and only transferred to the other servers when a connection is established. The changes are managed locally in so called Ticket Storages.

The following mechanisms take effect when conflicts occur on merging of change information after connection failures, for example:

- Deletion of a transponder is always carried out with priority. All possible changes before or after the deletion are discarded.
- If a transponder was edited from two locations, the last change is automatically carried out and transferred.
- To ensure data consistency, all above-mentioned data of a transponder are always saved and replicated together. The most recently saved data is replicated on all servers. So that it can be assumed that the transponder has the same name in all locations, even if simultaneous editing takes place, and changes of different users are not mixed up.

2.4 Replicated data

2.4.1 Transponder information

The replication service synchronizes the information on the transponders registered in the system, their configuration parameters¹ and their base data, such as the name or position in the object. If a transponder is integrated in the Locating Manager or removed from the Locating Manager using the "Device Assistant", this information is transmitted to all localization servers. Specifically, the following transponder information is replicated:

- Name
- Group (see note)
- Active in network/localization
- Software version information
- Text 1...5
- Physical model ID
- Antenna position¹

The group is identified via its name. If you move a transponder from the group "Reserve" to the group "In use" on Server A, a group with this name (In use) also needs to exist on Server B. If it does not exist, the transponder is moved into the default group on Server B. To prevent the transponder from also being moved into the default group on Server A due to such a configuration error, a move into the default group is not replicated. Likewise: If Server A moves the transponder from the "In use" group to the default group, the transponder on Server B remains in the group in which it was previously. The position data of the transponder is not replicated.

¹ If the antenna position is entered once, removal of the parameters is not replicated. In practice, removing the antenna position of a transponder is not a usual application, because this is normally set during integration or is not set from the beginning.

2.4.2 Transponder parameters

Transponder parameters, such as calibration values or transmit power, are also replicated. If a parameter is changed on Server A, this information is also replicated on Server B. Depending on where the transponder is located, the parameter is written to the transponder at that location. The information indicating that the parameter was successfully written is then replicated on all other servers. This can have the effect that you set a parameter at location A, if the transponder is in location B, the value is marked as unwritten in the usual way (a red exclamation mark after the value in the client) and is displayed as written a short time later, even though the transponder in location A is shown as unreachable. Reading out parameters is not possible in this case. Only changes are replicated, not commands. However, if a parameter changes on a transponder and is read out again, this parameter is replicated on all servers. You can therefore assume that all displayed parameters are correct. Parameters that have not been read out can be read out at the location at which the transponder is reachable by radio, however.

2.4.3 Transponder groups

The following data is replicated for transponder groups:

- Name
- Description
- Text description 1 to 5
- Number of missing sign of life cycles
- Sign of life tolerance
- Default physical model ID

The following rules apply:

- If a new transponder group is created, a new group is also created on all other servers - regardless of whether the name already exists.
- If a group with a name is deleted, the first group with this name is deleted on the other servers, provided it can be deleted (the default group cannot be deleted).
- If a transponder is moved into a group, the first group with this name is always used on all other servers. This can have unwanted effects if groups with the same name are created on a server. We recommend that you do not use such a configuration.
- The settings for locating range use of a transponder group are not part of the replication. This means that, if a transponder group is deleted on a server and created again, this transponder group loses its configuration regarding the assigned locating ranges on all servers.

3 Installation

The replication functionality is supplied with the server software and does not require a separate installation. Provided there is a valid license, the replication can be activated via the configuration file "LocNetBasicServer.ini".

3.1 Removing a server from the network

To remove a server from the replication network, you cannot simply disconnect it. In this case, all changes would be saved until it became available again. Follow the steps outlined below:

1. Shut down all systems.
2. Remove the server from the replication configuration of the other so that no other server sets up a replication connection to this server. Remove the replication configurator from the configuration file for this server.
3. Delete all ticket storages on all servers so that all changes that are not replicated are lost.
4. Restart all servers. It is important that the servers can exchange their node lists after startup before changes are made in the system.

Manual synchronization is then not necessary to transfer data from one server to all others.

4 Configuration

You can find notes on the settings of the Locating Manager in the system manual and in the relevant manuals on the clients. Only the configuration of the replication service is handled here.

The setup of the replication service on two localization servers - Server A and Server B - is explained below by way of example. In this case, Server A should establish a TCP connection to Server B.

Configuration takes place in "%SYSROOT%\LocNetBasicServer.ini" file. This configuration file is created during installation of the Locating Manager and is now expanded by the entries of the replication service.

Each replication component requires a unique ID. The system creates these automatically if they are not yet specified in the configuration file. Observe this when the configuration file is to be copied between servers.

```
[replication]

RTLS_LM_NetworkCommunication_Active=1
RTLS_LM_NetworkManagement_Active=1
RTLS_LM_ClientCommunication_Active=1

RTLS_LM_NetworkCommunication_uuid=c4454f5e-de3f-11e2-90f3-f5016b96d98d
RTLS_LM_NetworkManagement_uuid=ceac7210-de3f-11e2-90f3-f5016b96d98d
RTLS_LM_ClientCommunication_uuid=caa417d6-de3f-11e2-90f3-f5016b96d98d

RTLS_LM_NetworkCommunication_client="Server-B :19222"
```

This is an example configuration for Server A. In the case of Server B, the last line is omitted because it does not establish a connection. The ID has the following structure:

```
xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxxxxxx
```

As soon as the servers have been started after activation of replication, the Ticket Storage files appear in the directory. These files store all changes made in the system locally until they have been replicated on the other servers.

4.1 Commissioning, starting and operating the replication service

When the replication service is started, the data of the transponders needs to be synchronized once between all servers. For this purpose, there is the function to define a Locating Manager system as master, which then sends its data once to all other replication nodes. Afterwards, synchronization of individual changes of the configuration and the base data takes place. These changes typically occur for example during the integration of new transponders, or during configuration.

5 Updates

Because of the replication of nodes even when a connection is terminated, any system can be shut down, updated and restarted at any time. All changes during this time are applied during startup.

If there were changes in the replication system due to the software update, it is possible that only those data forming the lowest common denominator between all systems used is replicated.