

Roger Access Control System 5 v 2

Application note no. 008

Document version: Rev. A

Network communication

Note: This document refers to RACS 5 v2.0.4 or higher

Introduction

Computer network (Ethernet) is used in RACS 5 system for communication between MC16 controllers, VISO management software, RogerSVC servers (Windows services) and MS SQL Server database. Therefore for a proper operation of RACS 5 system, it is essential to ensure reliable and undisturbed transmission in such a network.

Note: In principle, the MC16 controller can be used in both WAN and LAN, while the manufacturer's warranty is covered only by working in an isolated LAN reserved exclusively for the access control system in which the controller is to be used.

Note: Before the decision on using the MC16 device, it is recommended to carry out tests confirming the satisfactory quality of its operation in the target LAN / WAN network. It should be assumed that a positive test result is not a guarantee of the correct operation of the device or system because the conditions in the network can change significantly while networks may be subject to cyber attacks.

Network communication

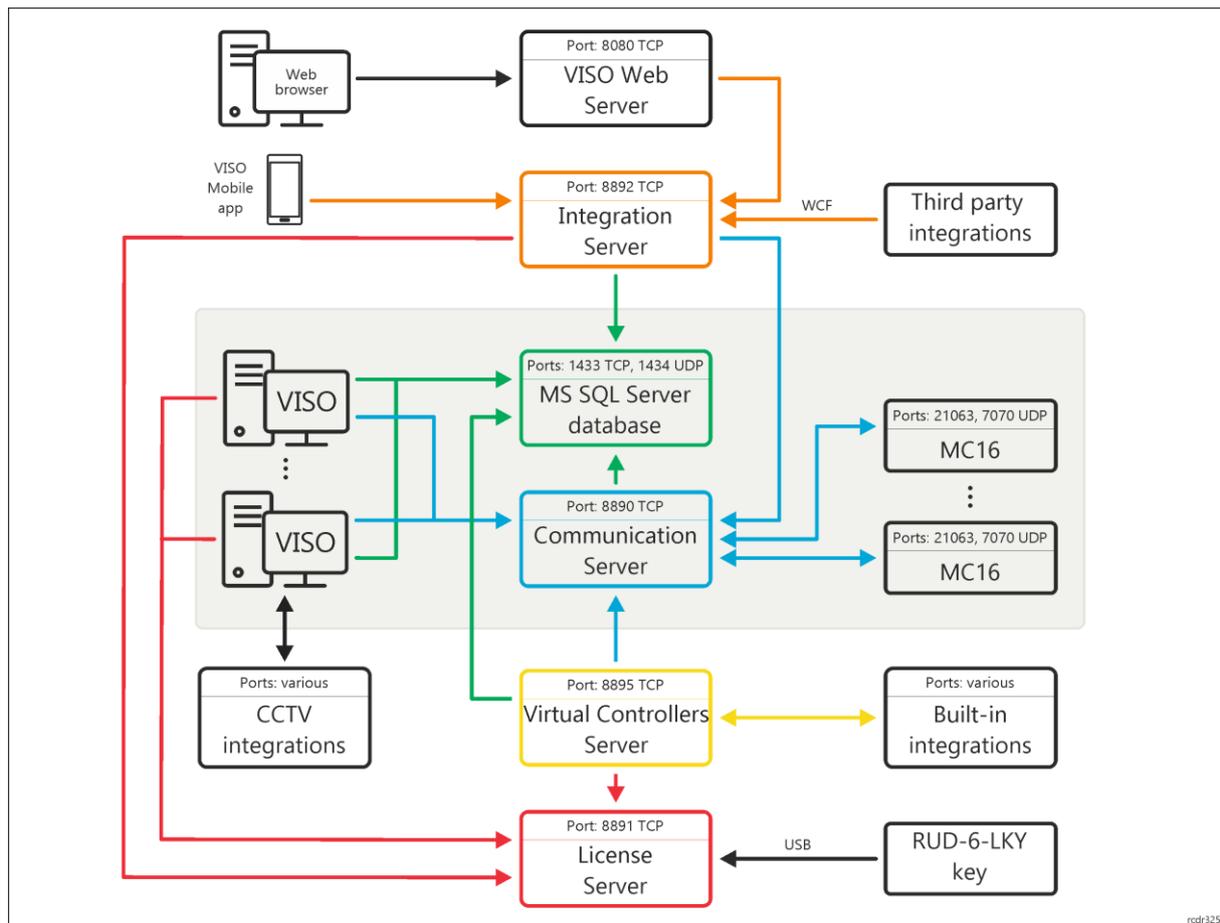
General concept of communication

RACS 5 includes mainly such hardware as MC16 access controllers, MCT readers and MCX expanders and it includes mainly such software as:

- VISO – RACS 5 system management software
- RogerSVC – software package with such Windows services as:
 - Communication Server
 - License Server
 - Integration Server
 - Virtual Controllers Server
 - VISO Web Server

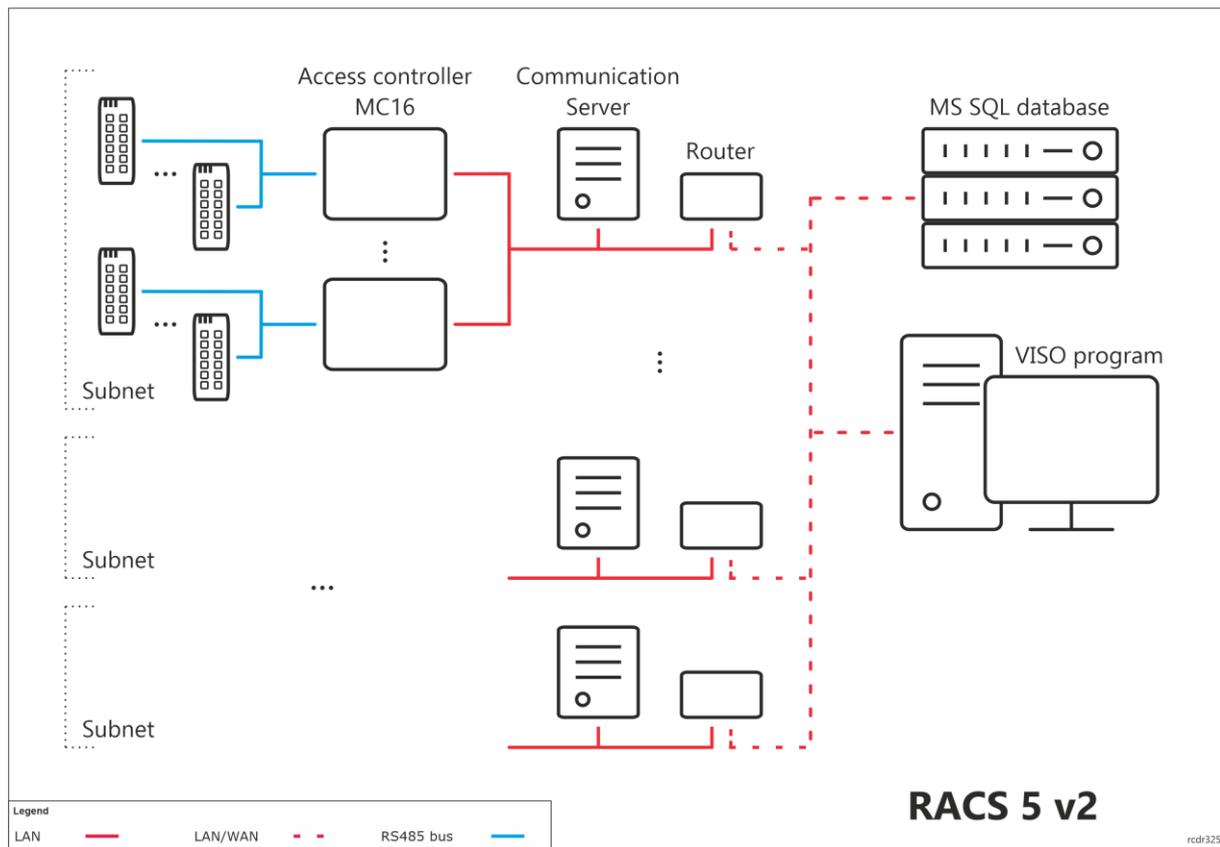
Communication Server is the necessary element of RACS 5 system and when some licensed functionalities are to be used in RACS 5 then the License Server is also required. The remaining servers are optional and they are applied in specific installation scenarios. Additionally, it is necessary to create MS SQL Server database according to AN017 application note.

The diagram below includes default ports. All ports except for 21063 UDP port of MC16 controller can be changed with RogerSVC software, VISO software or database management software. Servers can be installed on single computer or they can be installed on different computers and in such case only selected servers from RogerSVC software are installed on particular computer.



Communication Servers

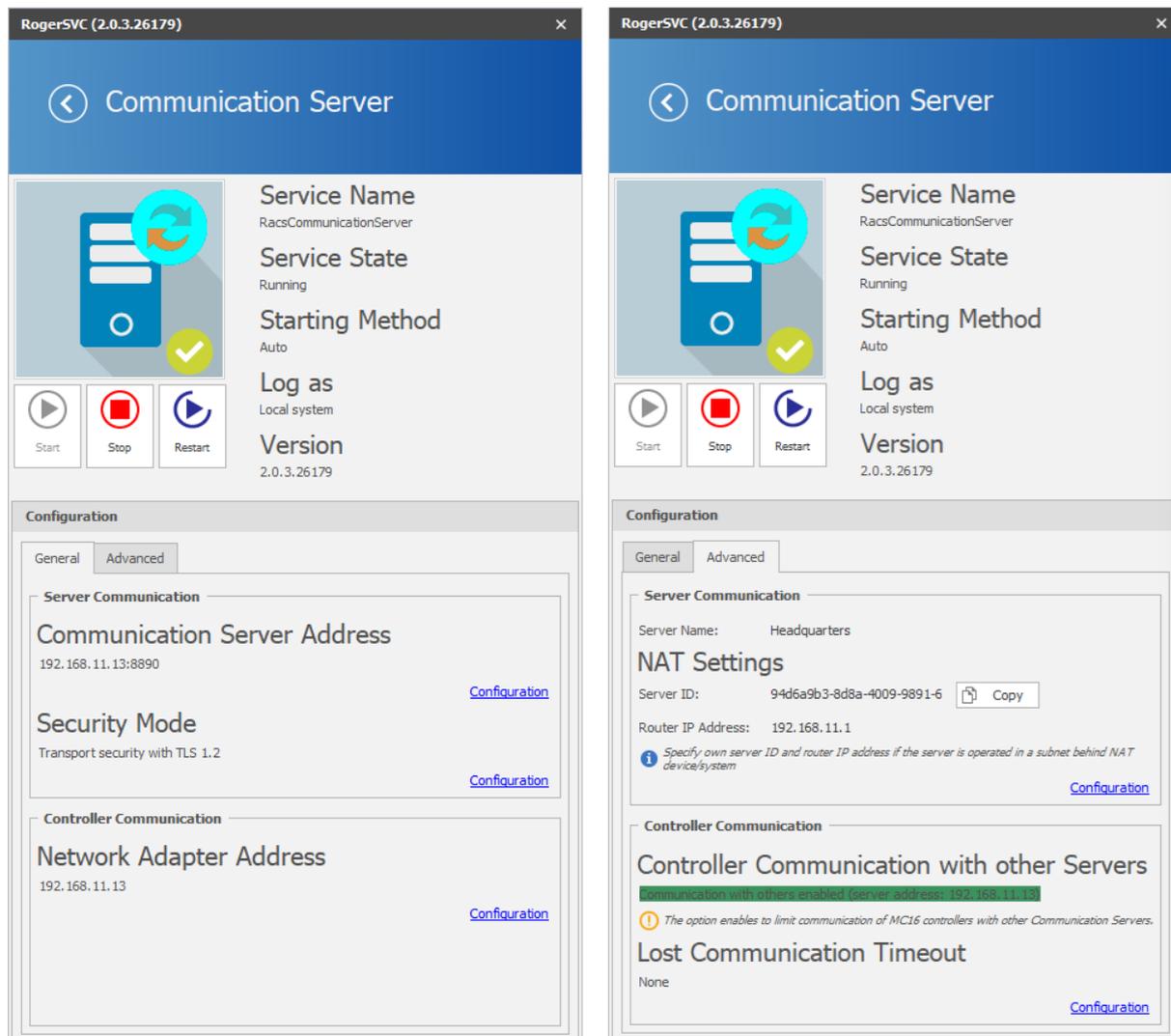
In RACS 5 v1 system it was necessary to create single Communication Server for the whole system. In RACS 5 v2 as in a diagram below it is possible to apply multiple Communication Servers i.e. computers with RogerSVC service installed. In practical applications, multiple servers are used in case of distributed systems where subnets are located in different buildings/cities/countries.



Communication via router (NAT)

In RACS 5 v2 system a new solution was implemented in regard of communication via router (NAT) instead of previous port forwarding for MC16 controllers. In order to define communication via router in RACS 5 v2 system:

- Install RogerSVC selecting Communication Server, start Roger SVC and click its icon in Windows tray.
- Select *Communication Server* tile and then *General* tab.
- Select *Configuration* and enter IP address of computer's network adapter to define local IP address of the Communication Server (e.g. 192.168.11.13). If necessary define own port instead of default 8890 TCP port.



- In the same window select *Advanced* tab.
- Click *Configuration* and in the opened window generate Server ID as well as define internal IP address of the router (e.g. 192.168.11.1).
- Start or restart the Communication Server.
- Configure your router in regard of port forwarding for the Communication Server (8890 TCP port by default).
- Start VISO program and during configuration of the Communication Server paste previously defined Server ID and enter public IP address of the router (e.g. 194.181.121.126).
- Click *Test* to verify the communication.

The screenshot shows a dialog box titled "Add Communication Server" with a "General" tab. The fields are as follows:

- Name: Headquarters
- IP Address: 194.181.121.126 (with a "Discovery" button)
- Port: 8890
- Security Mode: Transport security with TLS 1.2
- Server ID: 94d6a9b3-8d8a-4009-9891-661e14204009
- Synchronisation Schedule: (none)
- Description: (empty text area)

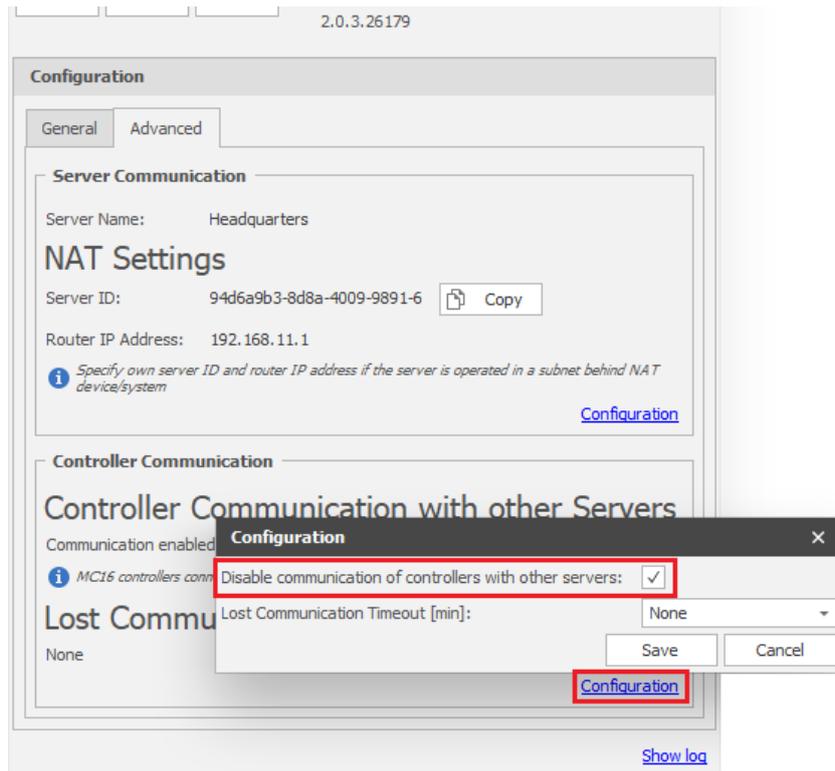
Buttons at the bottom: Test, OK, Cancel.

Security of communication

The communication with Communication Server can be secured with one of available methods which is selected during the configuration of Communication Server in RogerSVC software in *General* tab. The same Security Mode must also be enabled during configuration of Communication Server in VISO software.

The communication with MC16 access controllers is encrypted with AES 128 CBC method using configurable and individual communication key for each access controller. Additionally in RACS 5 v2 system it is possible to link the controller with the IP address of particular Communication Server. In such case, queries from other servers will be rejected by the controller even if correct communication key is used. Such association of servers and controllers may be useful in the system where clear grouping of access controllers is required or if it is necessary to secure the system against communication with unauthorised Communication Server installed in the computer network. Access controllers will be linked with Communication Server if the option *Disable communication of controllers with other servers* is activated during configuration of the server in RogerSVC software. Controllers which will be discovered for the first time in VISO software will be permanently linked with the server. They can be unlinked by deactivation of the previously mentioned option in RogerSVC program or by memory reset of particular MC16 access controller.

Note: Use the option *Disable communication of controllers with other servers* cautiously as in case of misuse it may disable communication with particular controllers in RACS 5 system and then device memory reset will be necessary. For example the communication will be disabled when the IP address of Communication Server is changed without earlier delinking of controllers from server or when controller is removed in VISO software without earlier delinking from server and then such controller is added to another Communication Server.



Typical network issues

Optimal and fully functional operation of RACS 5 system requires uninterrupted communication between controllers, servers from RogerSVC software and database. It can be achieved by cabling execution in accordance with standards and best practice. Following typical communication issues can be encountered during operation of RACS 5:

- Electromagnetic interferences coming from electric and power supply cables.
- The same physical network connection is used for RACS 5, CCTV IP cameras and audio/video streaming at the same time.
- Execution of Fast/Gigabit Ethernet network with low quality cabling.
- Network cable loops and bends.
- Parallel connections of devices resulting in network loops and significant traffic capacity drop.
- Installation of not efficient and wrongly configured network devices.

Network issues solving

In order to avoid mentioned above problems it is recommended to:

- Provide physically separated computer network for communication of controllers and Communication Server.
- Verify if electric and power supply are not laid too close to network cables.
- Install fiber optic cables between LAN distribution points.
- Install good quality copper cabling.
- Install network devices from well known manufacturers.
- Connect RACS 5 system network with other networks via routers.
- Provide workstation dedicated to RACS 5 operator/administrator.

Following errors in configuration of network devices can be encountered:

- Incorrect configuration of VLAN membership.

- Improper application of QoS.
- Incorrect application of port aggregation.
- Improper application of RSTP protocol.
- Torrent and peer-to-peer hosts in the network.
- Incorrect application of Multicast IP.

It must be also noted that quality of network communication can be affected by various external factors which must be accounted for, analyzed and distinguished on the stage of network designing.

Contact:
Roger sp. z o.o. sp.k.
82-400 Sztum
Gościszewo 59
Tel.: +48 55 272 0132
Faks: +48 55 272 0133
Tech. support: +48 55 267 0126
E-mail: support@roger.pl
Web: www.roger.pl