

# iS5 RAPTOR and JP Embedded R-GOOSE Gateway

## OVERVIEW

GOOSE, which stands for Generic Object Oriented Substation Event, was introduced by the IEC 61850 standard released in 2004. Its primary purpose is to notify peers about different protection events generated at an intelligent electronic device (IED) e.g. protection relay. In the first edition of the standard, it was specified as a protocol implemented directly on top of the link layer - Ethernet.

GOOSE over Ethernet has proven itself very good at meeting the low-latency requirements for this type of traffic. However, a limitation of this approach is that such communication is limited to the local network (LAN). With the introduction of DER and evolution of the grid towards distributed architecture, there is a need for a routable version of GOOSE. This raises the question of the cyber security of the information which is sent by an IED belonging to the critical infrastructure.

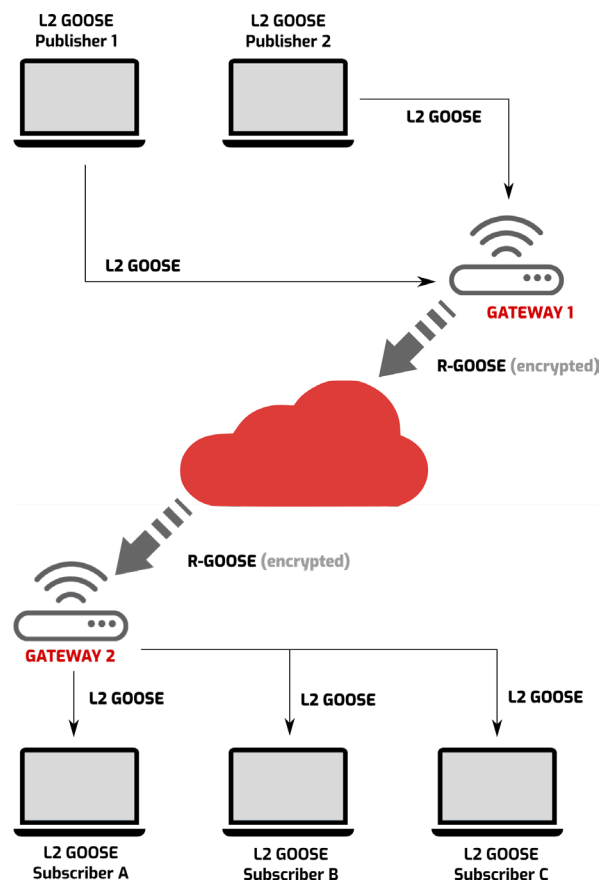
A simple, yet efficient solution could be to use a gateway converting between L2 and Routable GOOSE.

## BENEFITS

- No impact on existing IED s deployed in the field
- No need for software/firmware updates
- Flexibility and simplicity
- Support for authentication and encryption as specified by IEC62351-9
- Support for both dynamic distribution of encryption keys using KDC/GDOI protocol as well as static configuration.

## SOLUTION

There are several options for sending GOOSE messages over IP networks, like tunneling of layer 2(L2) GOOSE over UDP/IP or by implementing support for routable version of GOOSE on the IED. The approach with the JP Embedded external gateway is simple to implement and does not require any changes on the side of existing GOOSE publishers or subscribers. The gateway is a subscriber of the 'traditional' L2 GOOSE messages published by the IEDs connected to the local network, and publishes these received messages as UDP/IP multi-cast traffic. This is depicted in the picture below.



The main tasks of the gateway are:

- No impact on existing IED s deployed in the field
- No need for software/firmware updates
- Flexibility and simplicity
- Optionally encrypt payload of the outgoing R-GOOSE multicast packet

Depending on the need of specific applications, it is also possible to update some parameters of the published R-GOOSE such as application ID number, goose ID string, or customize the delay between re-send messages.

## JP EMBEDDED R-GOOSE GATEWAY ON RAPTOR

The RAPTOR is an intelligent cybersecure hardware platform with 64 Gb/s full line speed and 4 x 10Gb/s + 24 1Gb/s ports running the iBiome® OS. The iBiome® OS is an all-encompassing operating system that supports L2/L3 switching and routing on a single platform, including HRR and PRP. Its modular system of field replaceable modules, redundant hot-swappable power supplies, and ability to run third party software applications makes it a very flexible platform for today and the future. Combined with the JP Embedded R-GOOSE Gateway, RAPTOR will enable a single box solution for the challenging communications problems within a 61850 substation.

IS5 PART #	DESCRIPTION
IRM-iROC-RG	JP Embedded R-GOOSE Gateway

### ABOUT JP EMBEDDED

JPEmbedded is an embedded software house based in Cracow, Poland. Since 2006 we have been offering our clients custom software and hardware design, implementation and testing services. Our sweet spot is industrial communication, and we have wealth of experience with protocols like IEC61850, DNP3, Powerlink, Profinet, Ethernet IP. JPEmbedded also develops its own products which are communication solutions for powers systems. These include both software (platform independent libraries implementing standards like IEC61850, DNP3, ICCP) or network gateways which facilitate translation between virtually any protocols used by the industry.

Phones: (+48) 122662544; US sales: +1224 507 4677 • [info@jprembedded.eu](mailto:info@jprembedded.eu)  
Address: Spółka Jawna, ul. Strumienna 12, 30-609 Kraków, Poland

### ABOUT iS5 COMMUNICATIONS INC.

iS5 Communications Inc. ("iS5Com") is a global provider of integrated services and solutions, and manufacturer of intelligent Industrial Ethernet products. Our products are designed to meet the stringent demand requirements of utility sub-stations, roadside transportation, rail, and industrial applications. iS5Com's services and products are key enablers of advanced technology implementation such as the Smart Grid, Intelligent Transportation Systems, Intelligent Oil Field, and Internet of Things. All products have the ability to transmit data efficiently without the loss of any packets under harsh environments and EMI conditions. Visit [is5com.com](http://is5com.com) to learn more.

toll free: +1-844-520-0588 fax: +1-289-401-5206 • [info@is5com.com](mailto:info@is5com.com) technical support: +1-844-475-8324 • [support@is5com.com](mailto:support@is5com.com)  
Address: 5895 Ambler Dr, Mississauga, ON L4W 5B7