

MULTI-HOST MESSAGE ROUTING IN MADOCA II

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MADOCA

Abstract

SACLA introduced a second beamline (BL2) in 2014. To manage the complexity in multi-beamline operation, we redesigned control architecture to perform independent access controls by facility side, and reduce troubles in the ad hoc application for controls over firewall network. To fulfil the requirements, we implemented multi-host message routing in MADOCA II.

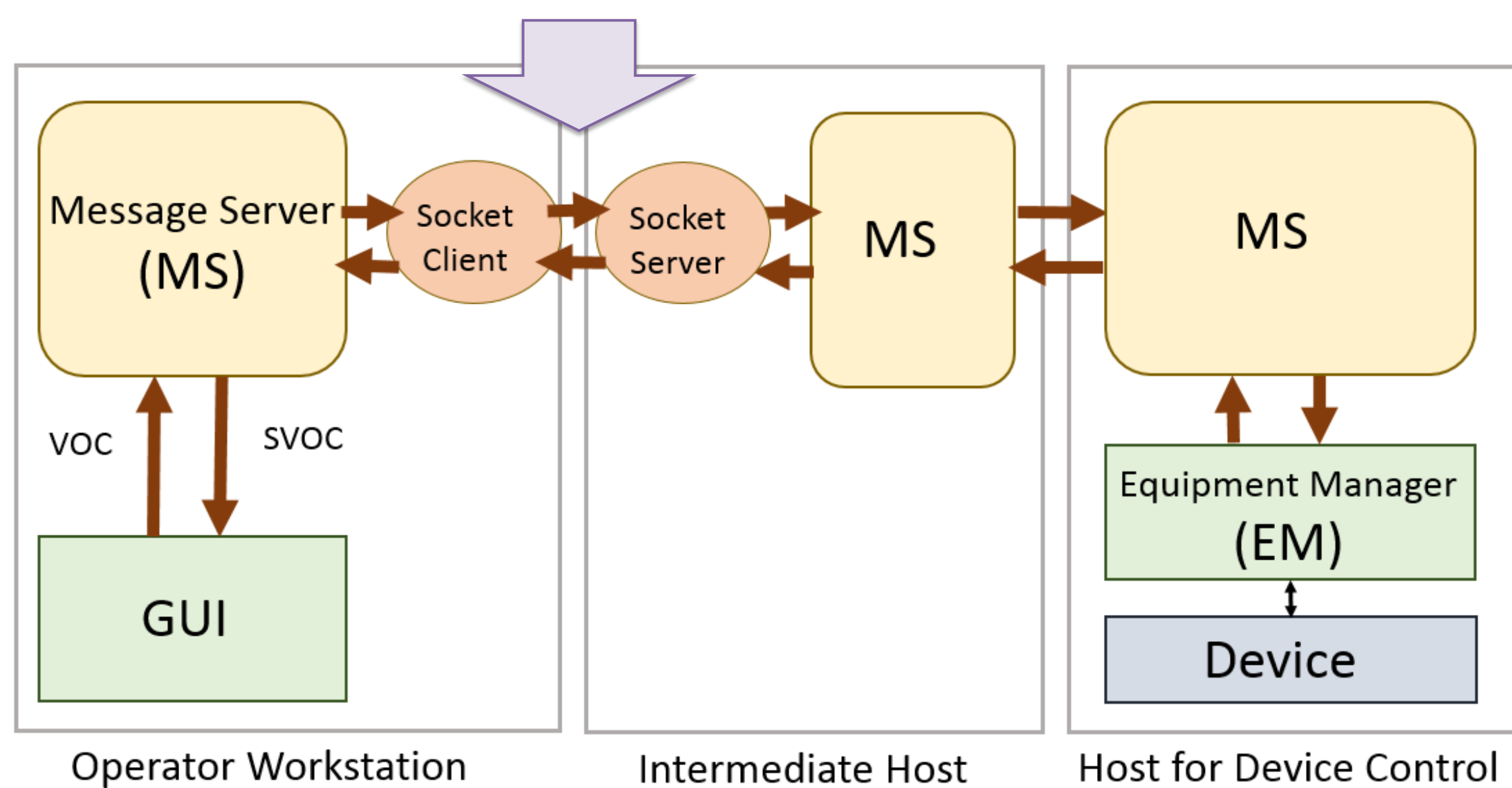
A BL master WS was introduced to intermediate all message commands between a GUI and an Equipment Manager (EM). Independent access controls can be managed by setting on the BL master WS, then the influence of miss-configuration by end-users was avoided. The new control architecture has been successfully implemented into SACLA DAQ system in September 2014.

Messaging Requirements in SACLA DAQ System

MADOCA II

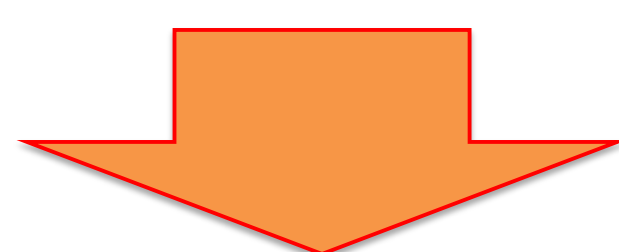
Message oriented control framework with **OMQ**

Ad hoc socket app. for controls over firewall network
Problems in troubles/complexities



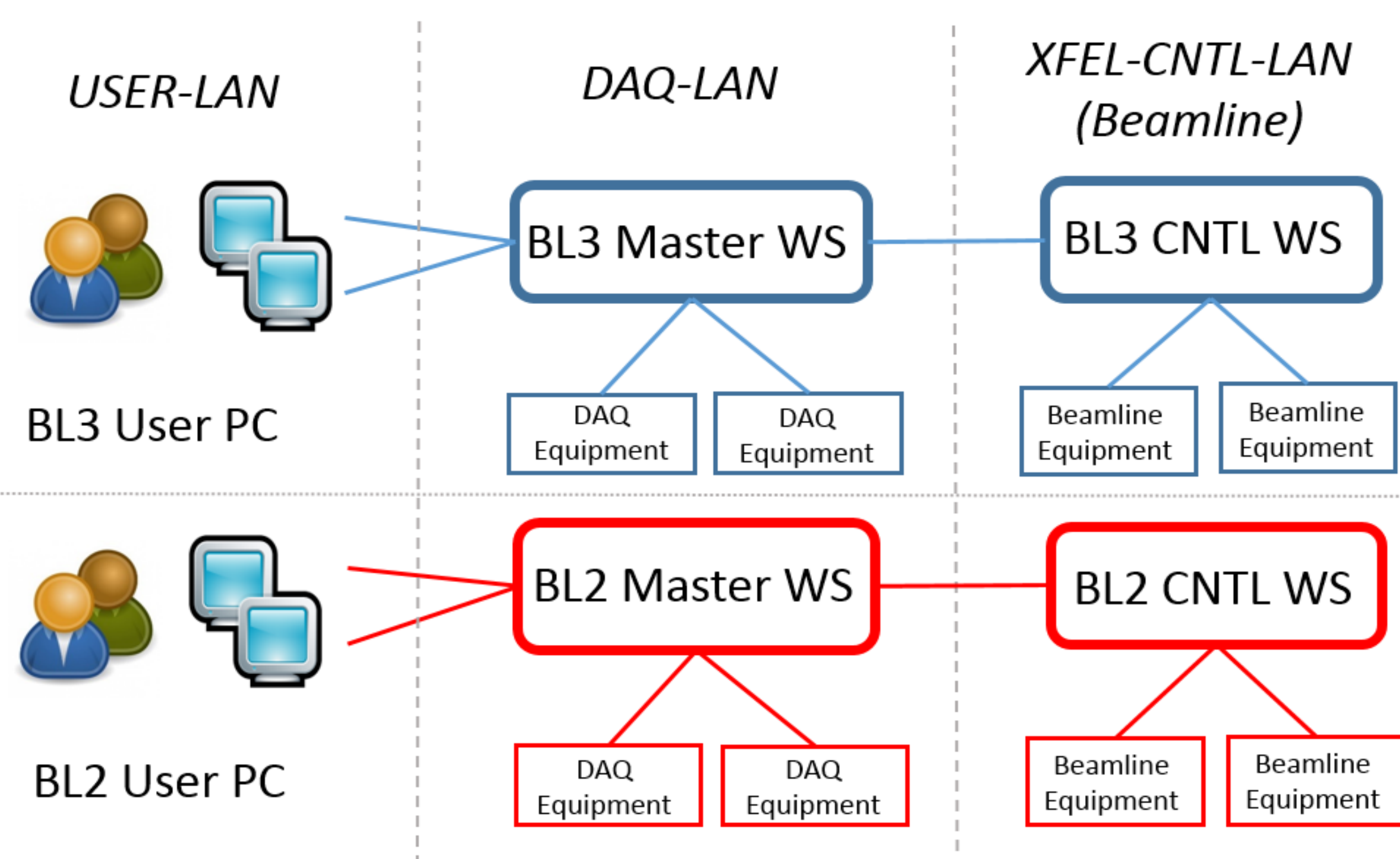
Redesigned control framework for the multi-beamline operation

- Get rid of the ad hoc socket application
- Independent access controls by facility side to avoid the influence of miss-configuration by end-users

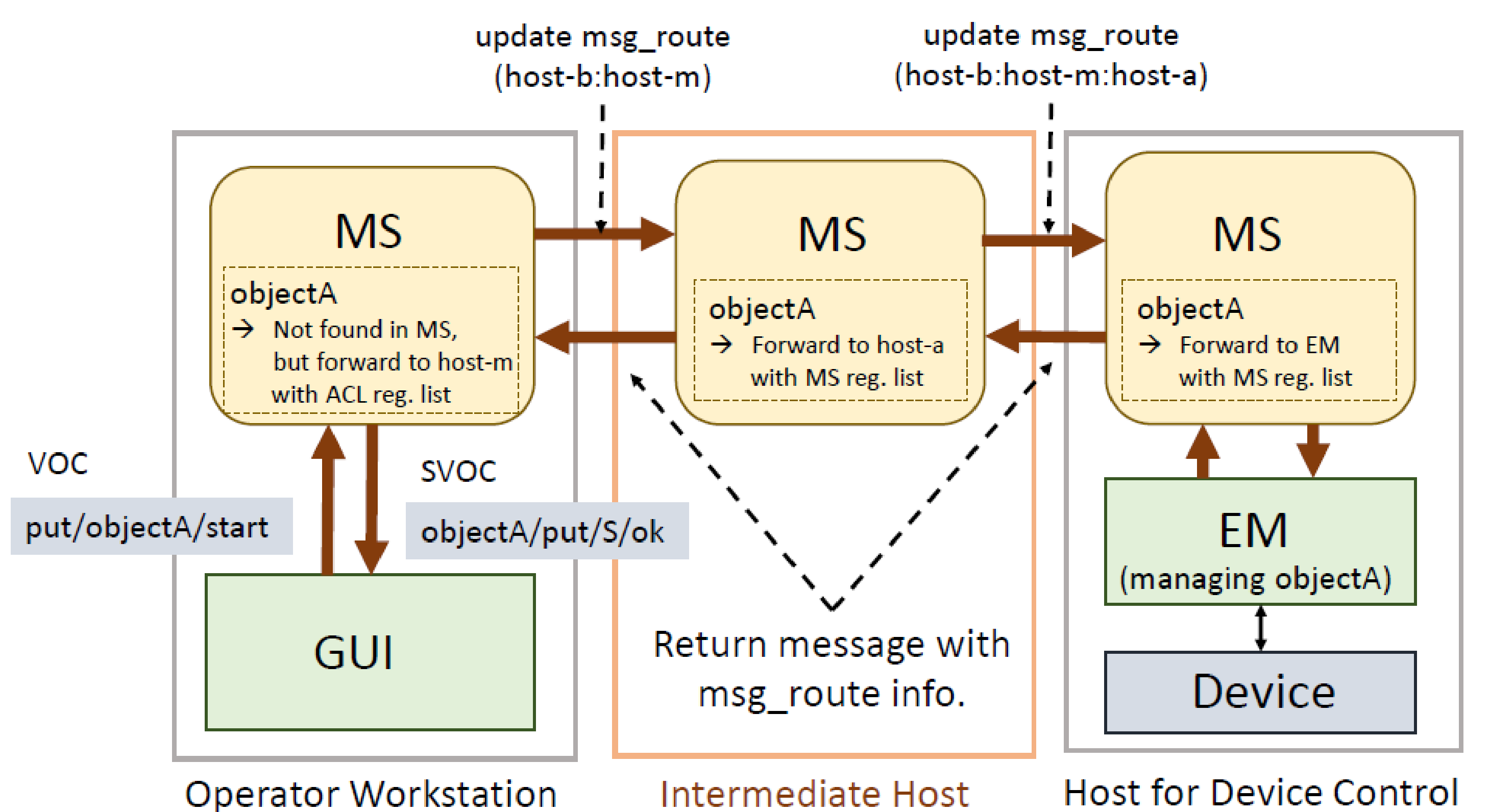


Solution

- Implement Multi-host Message Routing in MADOCA II
- Introduce a BL master WS to intermediate all message commands, and for independent access controls by MS setting on the WS



Multi-host Message Routing in MADOCA II



- At first, directly forward a message into an other host using ACL
 - Forward to the host where the objects used in an EM are accessible
- After that, the message is routed to an EM with usual manner
 - Utilize object information registered in MS
- Message route is attached in a message to identify the route to back the message to a GUI

Access Control in Message Server

object name	management method	account@hostname
sr_ms_serve	MS	*@*
sr_ms_manage	MS	control@localhost
object_fwd1	MS:host-1	*@*
object_fwd2	MS:host-1,host-2	*@*
object_ip1	MS	*@172.24.12.15
object_ip2	MS	*@172.24.12.0/24

For PCs with DHCP connections

- Access Control List (ACL) in a Defined File
 - Management of Access control for an each message
- Extended for message routing with management method
 - Message routing is performed for object names defined in ACL

Technical Issues

Prevention of Messaging Loop

- Checking the duplication of the hosts in the message route

Round-Trip Time (RTT)

Case	RTT
A GUI and an EM in the same host	0.40 ms
A GUI and an EM in different hosts	1.89 ms
A GUI and an EM in different hosts with an intermediate host	2.75 ms

- Tested with an EM which returns a clock
 - PCs with Intel Core i5-425U processor/1 GbE network switch under local network

Summary

- Multi-host message routing was implemented in MADOCA II to have sophisticated access controls
- Implemented into SACLA DAQ in September 2014, and it has been stably operating
- Also adopted into SACLA new beamline (BL1) in 2015
- Application to SPRING-8 beamline controls is undergoing