Site A
Private Address Space

Researcher
gpo229

Exp
Cntrl
Service
gpo229

Measurement
Orchestration
Service
gpo229

Discover
I&M Srvcs

Discover
Resources
and Assign
Slivers

Configure and
Program
Slivers

Manage
Services

Via CF

Via CF
and/or
ssh

Via CF
and/or
https

NAT

Site B
Public Address Space

Manage

Aggr Mgr
B

Assign

Meas
Info
Srvc
geni

Lookup
Srvc

Topology
Srvc

FW
IP GW

Layer 2 (VLAN) Ntwk

Experiment Traffic

Internet (and/oror Internet2, NLR Backbones)
Public Address Space (or Reachable Address Space)

Control Traffic

Measurement Traffic

NAT

Site D
Private Address Space

Aggr Mgr
D

Assign

SSH
Proxy

HTTP
Proxy

VPN
Access Srvr

Program   Manage

Meas Collect
Srvc
gpo229/
sliver201

Meas Analysis
Present Srvc
gpo229/
sliver202

Site C
Private Address Space

Manage

Meas
Info
Srvc
aggc

Lookup
Srvc

Topology
Srvc

NAT

Aggr Mgr
D

Assign

Switch C1

Program   Manage

Program   Manage

Program   Manage

Experiment
gpo229/
sliver101

Meas Pt Srvc
gpo229/
sliver102

Meas Collect
Srvc
gpo229/
sliver103

SSH
Proxy

LAN

Server C2

Program   Manage

DAG
Card

Meas Pt Srvc
ops003
sliver201

HTTP
Proxy

VPN
Access Srvr

Monitor

Site E
Public Address Space

Assign

Aggr Mgr
E

FW
IP GW

**MDA uses one (or
more) repository
services**

Manage

Meas Data
Archive Srvc
gpo229/
sliver301

Data
Repository
Srvc

Site A
Private Address Space

Internet (or Internet2 Backbone)
Public Address Space (or Reachable
Address Space)

Site D
Private Address Space

Exp
Cntrl
Service
gpo229

Measurement
Orchestration
Service
gpo229

Discover
I&M Srvcs

Discover
Resources
and Assign
Slivers

Configure and
Program
Slivers

Manage
Services

XMPP
Client

NAT

NAT

Reverse
SSH Tunnel

Via CF
and/or
ssh

SSH
Proxy

Program

Meas Collect
Srvc
gpo229/
sliver201

Meas Analysis
Present Srvc
gpo229/
sliver202

Case 1:
SSH Proxy

Forward
SSH Tunnel

Proxy
Pub Key

Proxy
Priv Key

One-time use

User
Priv Key

User
Pub Key

Installed by CF

Authentication by
SSH

Manage
HTTP

Manage
HTTP

HTTP
Proxy

Manage

Case 2a:
HTTP Proxy

Keys installed by CF
(keys persistent, or
generated for this use
only?

In OMF version 5.2 we are introducing the Extensible Messaging and Presence
Protocol (XMPP) for communication between the EC and the nodes.

User
Priv Key

User
Pub Key

Authentication by Web
Security
(signed messages)

All entities register with the XMPP server and subscribe to a set of PubSub
nodes. Messages posted to a certain PubSub node are relayed to all node
subscribers by the XMPP server.

(must responses be
signed? how?)

The message format is standardised XML, and we are making use of XMPP
standard features such as authentication, encryption and presence.

Register (to server)
authentication required?
how?
encryption required?

Messages can be sent to either a specific node through various identifiers,
such as the node's IP address or node ID, or they can be sent to groups.

Subscribe (to set of nodes)

A group can be a group of nodes as defined in the experiment script, or a
"meta" group such as all nodes in a specific experiment, session or domain.

XMPP
Server

XMPP
Client

Case 2b:
HTTP Proxy

Using XMPP's publish/subscribe scheme, each domain, session, experiment,
node and group is represented by a PubSub node.

Members of a group subscribe to the respective group nodes, all nodes in an
experiment subscribe to the experiment node, and each node subscribes to
their very own PubSub node named after their node ID or IP address.

Manage
XML Msg (signed)

In order to send messages to a certain node or group, the sender just needs
to pick the right PubSub node to publish to.

Notify
XML Msg (signed)

Keys installed by CF
(keys persistent, or
generated for this use
only?

Case 3:
VPN Access Server

User
Priv Key

User
Pub Key

Authentication by Web
Security
(signed messages)

Srvc
Pub Key

Srvc
Priv Key

Site B
Private Address Space

Site C
Private Address Space

Case 2b:
HTTP Proxy

SETUP DATA
HTTPS

SETUP DATA
HTTPS

Meas Collect
Srvc
gpo229/
sliver103

HTTP
Proxy

NAT

Meas Collect
Srvc
gpo229/
sliver201

Meas Analysis
Present Srvc
gpo229/
sliver202

Installed by CF

MC Srvc
Pub Key

MC Srvc
Priv Key

Authentication by
Web Security

Case 3:
VPN Access Server

Data Flow over SCTP
Inside Tunnel

Meas Collect
Srvc
gpo229/
sliver103

NAT

VPN
Access Srvr

Meas Collect
Srvc
gpo229/
sliver201

Installed by CF

VPN Srvr
Pub Key

VPN Srvr
Priv Key

MC Srvc
Pub Key

MC Srvc
Priv Key

Authentication by
Access Server