

GENI Cluster D Roadmap for Spiral 2

Ver. 2.1
October 15, 2009

Based on Cluster D meeting at GEC5 on 7/21/09
After discussions with Ilia on 8/3/09 and 8/18/09
Including ORCA release info received 9/14/09
After discussion with IMF project on 9/16/09

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1. GENI Goals for Spiral 2

The following goals have been established by the GPO for Spiral 2.

Goal 1: Live experiments, the central goal of Spiral 2. Support significant numbers of research experiments in the end-to-end prototype systems. The GPO expects live experimentation to begin near the end of Spiral 1, which will intensify through Spiral 2 as we begin continuous operation of the prototype systems. This will begin to give us all substantial (early) operational experience, as these experiments will help us all understand the prototypes' strengths and weakness, which will drive our Spiral 3 goals.

Goal 2: Identity management

Goal 3: Improved integration of data & control planes, within clusters

Goal 4: Instrumentation

Goal 5: Interoperability, permitting clusters to access the widest number of aggregate

2. Cluster D Entities for Spiral 2

ORCA/BEN clearinghouse and aggregate (1582 & 1700)	PI: Ilia Baldine
IMF aggregate (1718)	PI: Rudra Dutta
Included: ERM measurements (1631)	PI: Keren Bergman
DOME aggregate (1599)	PI: Brian Levine
ViSE aggregate (1602)	PI: Prashant Shenoy
Cloud-control aggregate (1709)	PI: Michael Zinc
Kansei aggregate (1633)	PI: Anish Arora
OKGems aggregate (1716)	PI: Andy Li
LEARN network (1733)	PI: Deniz Gurkan
iGENI (Starlight) Crossconnect (1719)	PI: Joe Mambretti
GENI operations (including aggregate)	PI: Heidi Dempsey

3. Key Dates in Spiral 2

Begin	10/1/09 (9/1/09)
ORCA Rel. 1.3	10/1/2009
GEC6	11/16/09
ORCA Rel 2.1	2/1/10
GEC7	3/16/10
ORCA Rel 2.2	6/1/10
GEC8	7/20/10

End 9/30/10 (8/31/10)
 ORCA Rel 2.3 10/1/10

4. ORCA Release Capabilities

The following roadmap describes features and capabilities of ORCA software releases.

These releases are currently scheduled for every 4 mo. , and include work done by both Solicitation 1 (1582) and Solicitation 2 (1700) ORCA projects.

ORCA Rel. 1.3 10/1/2009
 ORCA Rel 2.1 2/1/10
 ORCA Rel 2.2 6/1/10
 ORCA Rel 2.3 10/1/10

schedule.

Feature/Subtask	Explanation	Release
Better packaging	Simplified installation, config script auto-configuration, simple usability extensions, simplified certificate management	2.1, 2.2, 2.3
Keymaster	Keymaster simplifies security configuration for experiments.	2.1
Lease feature extensions	Enable cancellation and renegotiation of leases prior to their expiration. When can these fix DOME issues? Perhaps earlier?	
Phase 1	Enabling simple non-reverting cancellations	2.1
Phase 2	Enabling fully implemented cancellations	2.3
Configuration Manager	Flexible configuration manager capable of executing arbitrary sequences of configuration actions with complex control flows on complex substrates. Configuration commands can be created using either NDLE toolkit or custom mechanisms.	2.2

Substrate support	Additional drivers/handlers for new types of substrate	
Computational substrate	Integration of Eucalyptus	2.1
Resource Description Mechanisms and Policies	Ontology-based resource description mechanisms integrated into ORCA-core	
Computational substrate ontology	Initial ontology for edge computational substrates	2.1, 2.2, 2.3
Measurement substrate ontology	Initial ontology for substrate measurement capabilities	2.2, 2.3
Ontology integration	Integration of ontology resource handling mechanisms into ORCA core	2.1, 2.2, 2.3
Policy development	Development of resource provisioning policies based on ontologies	2.1, 2.2, 2.3
Resource discovery	Enable dynamic resource discovery.	
Actor registry/Trust brokering	Single registry of actors, including brokers. Also simplifies trust setup.	2.1
Broker querying	Ability to query a broker about resources (available and total delegated). Consistency not enforced.	2.2
External experiment control	Provide user the ability to drive experiments outside the portal Fig 1-6	
Gush integration	We plan a generic XML-RPC interface for use by experiment control tools written in multiple languages. This interface supports a subset of ORCA resource reservation capabilities modeled after the ProtoGENI XML-RPC interface and enables (possibly modified) Gush to be ORCA experiment control tool.	2.1
External management interface	An extensible SOAP-based interface allowing ORCA to interface with management entities. e.g. GMOC.	
GMOC integration	Providing GMOC capabilities to look at current slices and a STOP SLICE 'button'.	2.2
Backbone integration	Integration with dynamic provisioning mechanisms of major national research networks	
NLR Sherpa	Integration with Sherpa CGI	2.1
I2 DCN	Integration with Internet2 IDC (also enables	2.1

	Dragon)	
Identity management	Establish use of identity management system to authenticate principals and portals	
Initial Shibboleth integration	Integrate with Shibboleth to provide portal-level authentication Fig 1-5	2.1
In-depth Shibboleth integration	Integrate with Shibboleth at the level of service manager and user tools	2.3

5. Cluster D Operating Capabilities

The following roadmap describes features and capabilities of the Cluster D operating environment, including a production-level Cluster D clearinghouse.

Feature/capability	Current state/limitations	Enhancements	Expected date
Cluster D (RENCI) clearinghouse Fig 1-1, 1-2	No externally accessible clearinghouse available.	Externally accessible clearinghouse maintained as a production capability. Ready to accept broker implementations from other teams. Parallel use of local and CH brokers. Ticket system established.	C Completed by ORCA 8/1/09
Local and CH brokers for all aggregates, use in parallel Fig 1-1, 1-2, 1-3		Tickets assigned separately to local and CH brokers, either some to each or toggle, i.e., all to one or all to the other.	C All S1 aggregates by 10/1/09 BEN: ? DOME: Yes ViSE: Yes Kansei: Yes ERM: x
Local and CH brokers for all aggregates, arranged in serial (hierarchical) Fig 2-2	With brokers in parallel, do not have the ability to get some of the tickets	Tickets assigned in serial (hierarchical) to local and CH brokers. Upon request from local SM to local broker, it provides ticket. Upon request from remote SM to CH broker, it gets ticket from local broker, and provides ticket.	1 per GPO When?

All S1 aggregates regularly available for use by researchers using remote SMs and CH brokers. Fig 1-4		All S1 aggregates regularly available for use by researchers using remote SMs and CH brokers.	C per GPO All by 11/16/09, GEC6
All S1 aggregates identify POC for GENI Prototype Response and Escalation team Fig 1-4			C per GPO All by 11/1/09
All S1 aggregates identify POC for Security team Fig 1-4			C per GPO All by 11/1/09
All S1 aggregates provide Security team with input for security review Fig 1-4			C per GPO All by 11/1/09 and 3/1/09
All S1 aggregates provide instrumentation and monitoring improvements		BEN: Now: ? New: ERM, see 1700.1. DOME: Now: monitoring of operations. New: mechanism to allow experimenter to get data off of the bus. ViSE: Now: rudimentary monitoring of nodes, connectivity, Xen stats. New: ? Kansei: Now: ? New: add measurements ERM: New: Prototype hardware to add to BEN.	I When?

6. Cluster D VLAN Capabilities

The following roadmap describes the Cluster D VLAN capabilities.

Feature/ capability	Current state/limitations	Enhancements	Expected date
BEN connects to NLR		Uses connections pre-configured in NLR	C Completed 7/09
All S1 aggregates connect to Internet2 (or NLR) with link capable of Layer 2 connection		All aggregates complete link for layer 2 connection to Internet2 or NLR.	C All by 10/1/09 BEN: Yes, to NLR DOME: Pending, to NLR or I2. ViSE: same Kansei: ? ERM: x
All S1 and S2 aggregates plan for the setup of VLANs between testbeds in Cluster D		Cluster D completes plan for the setup of VLANs between testbeds, to be carried by Internet 2 (or NLR) backbone network between the testbeds	C per GPO All by 11/16/09, GEC6
All S1 aggregates use ORCA to setup VLAN connections to backbone network		All S1 aggregates use ORCA to setup connections to backbone network, e.g., Internet2 or NLR	C per GPO All by 3/16/10, GEC7
VLAN connections can be setup between two (or more) S1 aggregates		VLAN connections can be setup between two (or more) aggregates that are being used in one experiment.	C per GPO All by 7/20/10, GEC8

7. Cluster D Experiment Capabilities

The following roadmap describes the overall Cluster D experiment capabilities.

Feature/ capability	Current state/limitations	Enhancements	Expected date
All S1 aggregates ready for experiments by outside researchers Fig 1-3		All S1 aggregates ready for experiments by researchers. Access typically via portal to local SM and local broker.	C All by 10/1/09 BEN: ERM project; when? DOME: Undergraduate networking class in fall 2009; yes ViSE: Using rapidly deployable node; yes Kansei: Internal researchers; when? ERM: x
All S1 aggregates ready for experiments by researchers using remote SMs and CH brokers. Fig 1-4		All S1 aggregates ready for experiments by researchers using remote SMs and CH brokers.	C per GPO All by 11/16/09, GEC6 For each S1 aggregate, how can remote portal and SM be built?
All S1 aggregates have experiment using their substrate and at least one more substrate, connected via VLAN provided by Internet2 or NLR Fig 1-7		All S1 aggregates have experiment using their substrate and at least one more substrate, connected via VLAN provided by Internet 2.	C per GPO All by 7/20/10, GEC8
All S1 aggregates ready for experiments by outside researchers that involve two (or more)			C per GPO All by 10/1/10

aggregates
Fig 1-7