

GENI

Global Environment for Network Innovations

Milestone 1 DMEAS: Review all Substrate Technologies (DRAFT)

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“Data Plane Measurements”

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1 Document Scope

This section describes this document’s purpose, its context within the overall GENI project, the set of related documents, and this document’s revision history.

1.1 Executive Summary

This technical note presents the results obtained in work package “Milestone1: Review all Substrate Technologies” of Project Nr. 1653, “Data Plane Measurements”. The purpose of this milestone is to document review in all substrate technologies in spiral 1 from a measurement and monitoring point of view. In Section 2 we assess all substrate technologies from a measurement and monitoring point of view based on the current version (GENI-INF-PRO-S1-CAT-01.5) of GENI’s “Spiral 1 substrate catalog” [geni09_1].

1.2 Related Documents

The following documents are related to this document, and provide background information, requirements, etc., that are important for this document.

1.2.1 GENI Documents

Document ID	Document Title and Issue Date
GENI_QSR_D_MEAS-v5	4Q08 Status Report
GENI-INF-PRO-S1-CAT-01.5	GENI Spiral 1 Substrate Catalog

1.3 Document Revision History

The following table provides the revision history for this document, summarizing the date at which it was revised, who revised it, and a brief summary of the changes. This list is maintained in chronological order so the earliest version comes first in the list.

Revision	Date	Revised By	Summary of Changes
1.0	01 Mar 09	D. Gurkan	Initial draft

2 Review Substrate Technologies

2.1 Overview of Milestone 1

The objective of this document is to review all (optical, wireless, edge compute, etc.) substrate technologies (list provided by GPO) in spiral-1 from a measurement and monitoring point of view based on the current version of GENI's "Spiral 1 substrate catalog" [geni09_1]. Some prototype information has not been posted yet. Data plane measurements can be classified as embedded and external measurements that are required to monitor the physical layer characteristics on GENI. Therefore, all substrate technologies need to be examined to determine their embedded measurement capabilities in addition to the data plane measurements that prototypes offer. This report outlines these substrate technologies as they have been made available by the Spiral-1 prototypes. Since minimal data plane measurements have been included in the instrumentation and measurement components of each prototype, only substrate technologies have been listed and we refer to the measurements to be completed in the second milestone, embedded measurement capabilities.

The embedded measurement capabilities for the substrate technologies are documented in "Embedded Measurements in substrate technologies" document [geni09_2]. Embedded measurements are readily accessible measurements on network nodes that are mostly provided as supervisory control or remote monitoring capabilities. Remote connectivity and access capabilities of these measurements are very important for a GENI researcher.

Depending on needs assessment with control framework and real-time measurement capabilities, external measurement equipments will be investigated.

2.2 Review all substrate technologies in spiral-1

Table 1 gives the summary of various substrate technologies and their network infrastructure and the embedded measurements available in each of the substrate. External measurement capabilities will be investigated in future milestone.

Table 1. Substrate Technologies in each Spiral-1 Prototype.

	Substrate	Network Infrastructure	Measurement
Cluster A	TIED	Information not posted yet.	Information not posted yet.
Cluster B	Mid Atlantic Network	Regional optical network, 10 Gbps DWDM optical nodes, 10 Gbps Ethernet switches, Computer servers	[geni09_2] document
	GpENI	Regional optical network, 10 Gbps optical switches, 10 Gbps Ethernet switches, Programmable Routers, Site-specific experimental nodes	[geni09_2] document
	Enterprise GENI	Campus wide programmable Ethernet switches	[geni09_2] document
	Planet Lab	Information not posted yet.	Information not posted yet.
	SPP Overlay	High performance overlay hosting nodes, netFPGA cards	[geni09_2] document
Cluster C	CMU Testbeds	Small scale Emulab testbed, Residential small form-factor machines, Wireless emulator	[geni09_2] document
	Proto-GENI	Backbone Sites, Programmable 10 GBE Ethernet Switch, PC's with NetFPGA cards	[geni09_2] document
	Programmable Edge Node	Intel IXP2855 network processor based programmable edge node	[geni09_2] document
	Measurement System	PC based IP Packet monitors, Data Storage Systems	[geni09_2] document
Cluster D	BEN	Regional optical network, Optical fiber switch, 10 Gbps Optical Transport, 10 Gbps Routers/Switches, Site-specific experimental nodes	[geni09_2] document
	DOME	Metro mobile network, compute nodes, variety of wireless interfaces, GPS devices, wireless access points.	[geni09_2] document
	ViSE	Multi Sensor (camera, radar, weather station) Network	[geni09_2] document
	Kansei Sensor Networks	Wireless sensor networks	[geni09_2] document
Cluster E	WiMAX	IEEE 802.16e WiMAX base-station	[geni09_2] document
	Orbit	Heterogeneous and Mobile Wireless Testbeds	Information not posted yet.

Among all prototypes listed in Table 1, the most viable data plane measurement capabilities are available only in the following prototypes at this time: Mid-Atlantic Network, GpENI, BEN, DOME, ViSE, WiMax. Other

prototypes have measurements available at higher layers, from layer 2 up in the form of packet counters, flow rates, etc.

Disclaimer: The summary of substrate technologies available in GENI's substrate infrastructure given in this section does not raise the claim of completeness. GENI working group members are invited for further discussions. Any information about additionally, current or future, available at the substrate level should be sent to the authors (cf. contact information [geni08_1]) to be included in future revisions of this document.

3 Bibliography

[1] [geni09_1] GENI Project Office, "Spiral 1 substrate catalog", 22 February 2009.

[2] [geni09_2] GENI "Embedded Measurements in Substrate Technologies", 01 March 2009.