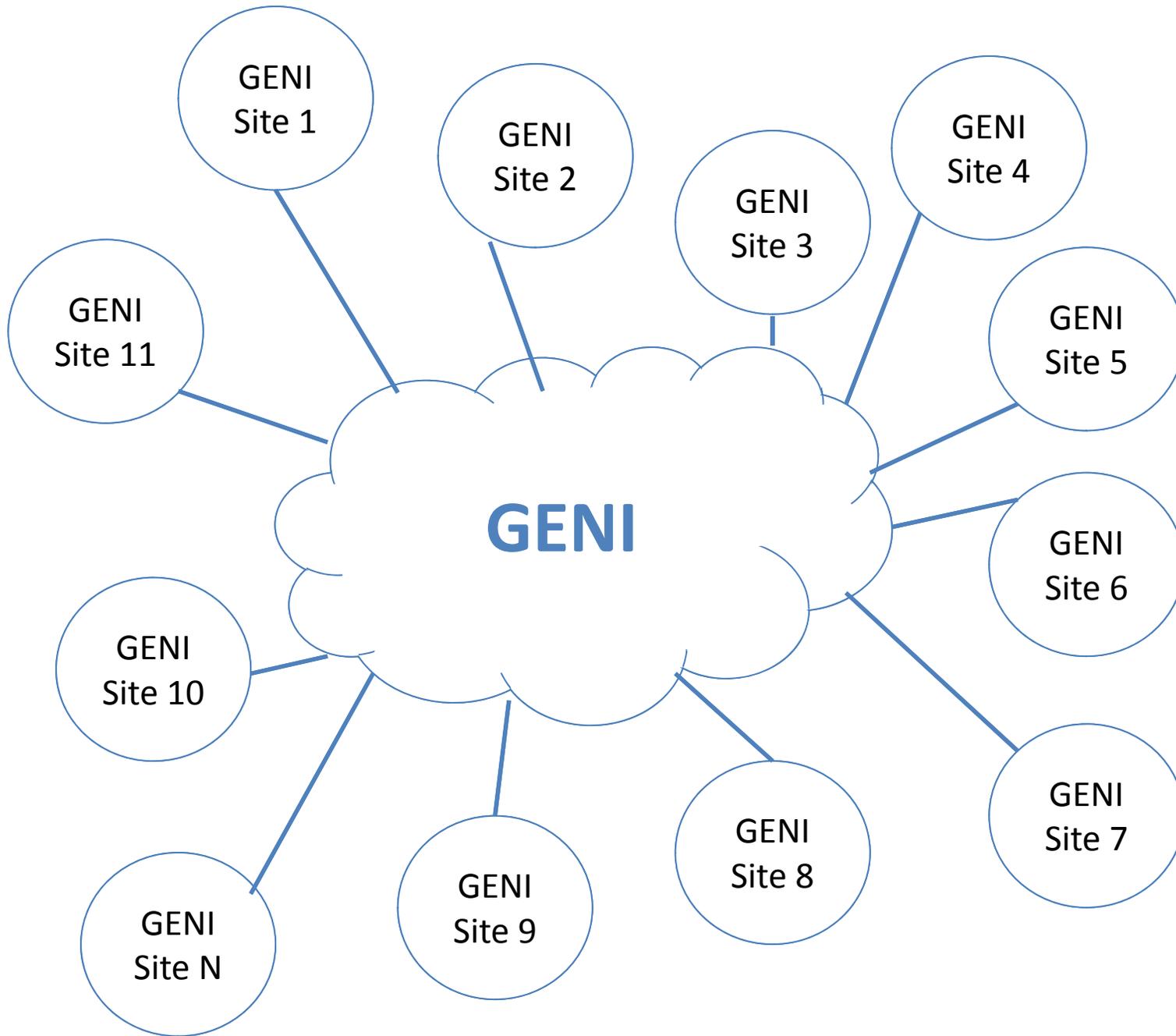


Connecting GENI with iGENI

Discussion / Goals / Directions

Josh Karlin ,Harry Mussman, and

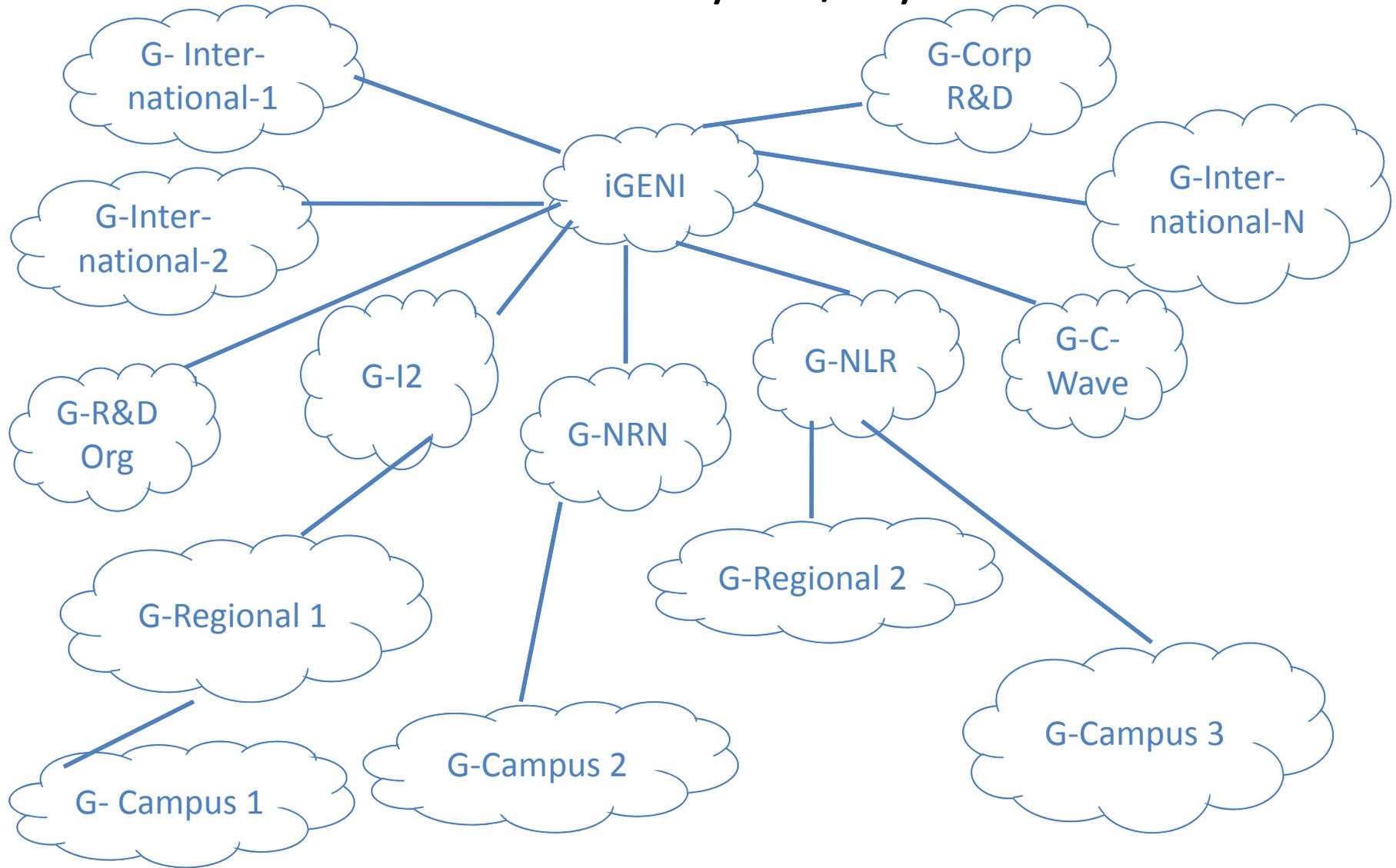
Joe Mambretti



iGENI Components

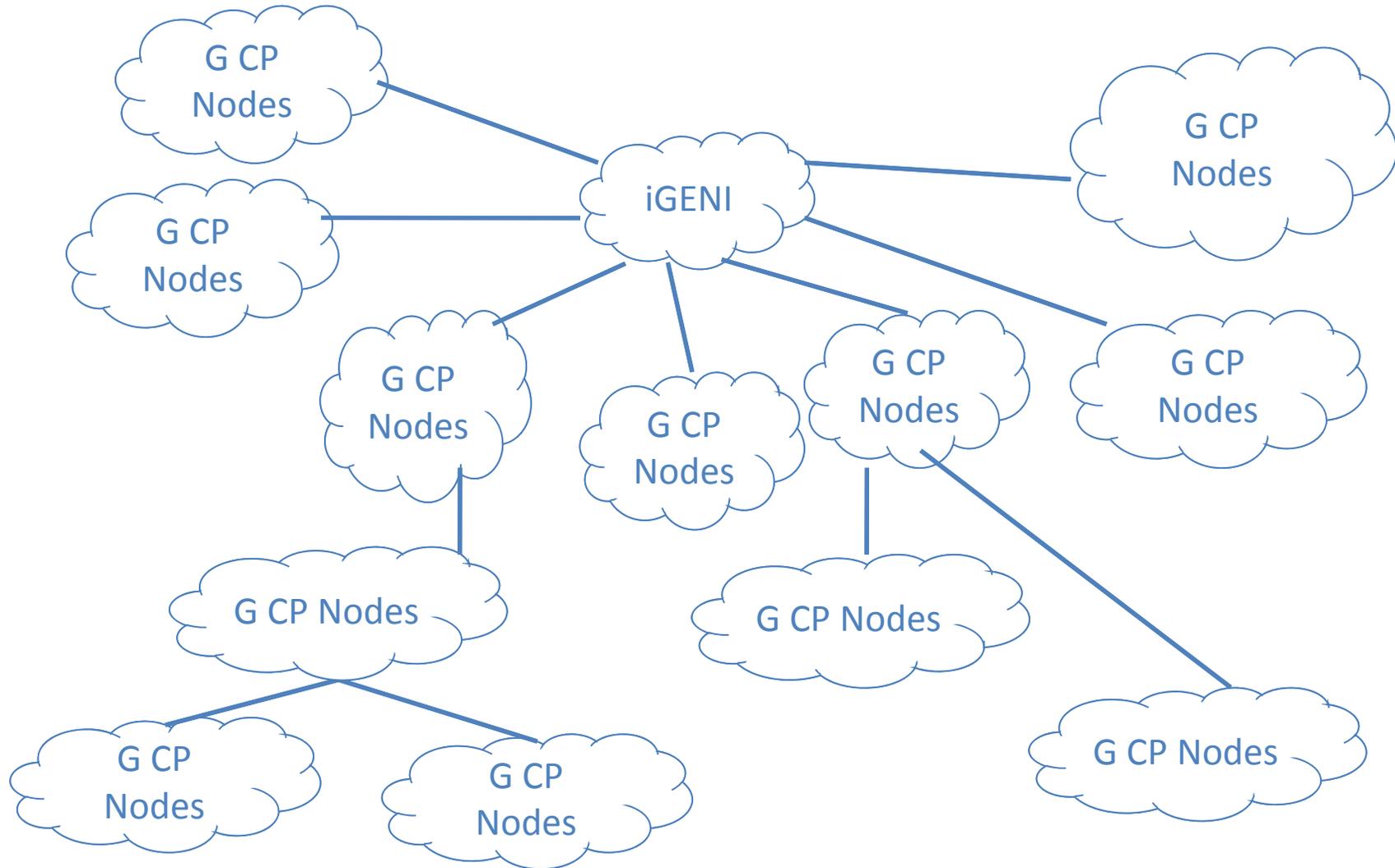
- GENI Core Infrastructure
- L1/L2 Core Paths
- Control Plane
- Management Plane
- Resource Management Processes
- Resource Data Paths
- Core Resources
- Experimental Resources

iGENI Will Enable Aggregates To be Internally Connected at Layer 2/Layer 1



G-N = Core Resources *Dedicated To* GENI

iGENI Will Provide Layer 2/Layer 1 Paths For a GENI Control Plane



CP Nodes = Core Resources *Dedicated* To iGENI CP Functions

External Aggregate Interfaces Are L1/L2 Paths (e.g., vLANs, Tunnels, Et AI)

- MPLS (L 2.5)
- vLANs
 - Mapped at ingress/egress or
 - Tunneled (q-in-q)
- Tunnels
 - Layer 2, such as OpenVPN
- SONET/SDH, GFP, vCAT Channels,
- Layer 1
 - Lightpaths
- Provisioning
 - Statically Provisioned Based on Requirements
 - Partially Dynamically Provisioned Based on Requirements
 - Dynamically Provisioned Based on Requirements

iGENI As An Aggregate

- Through A Core Resources Control Plane, iGENI Will Selectively Advertise Its External Interfaces, Including vLANs Interconnecting Dedicated GENI Resources Provided By Regionals (e.g., LEARN), Nationals (e.g., I2, NLR, C-Wave), Internationals, Non-Profit R&D Organizations, Corporate R&D Organizations, etc.
- Other L1/L2 Paths May Also Be Supported (e.g, Via A Tunneling Service, Lightpaths, Standard Optical L2 Framing, Etc.
- Core L1/L2 Resources Will Be Identified Via Standard L1/I2 Resource Addressing
- Through A Control Plane Implemented To Support Experimental Resources, iGENI Will Advertise Its External Interfaces, Including vLANs, Interconnecting Allocatable GENI Resources.
- Experimental L1/L2 Resources Core Resources Will Be Identified Via A Higher level of Abstraction Than Used By L1/I2 Core Resource Addressing

Example: Core vs Experimental Resource

- Site 1 ↔ Site 2
- 10 G Optical Path
- Path Supports Multiple vLANs, e.g.,:
 - Control Plane vLAN
 - Core Infrastructure vLAN
 - Experimental Resource vLAN

iGENI As An Aggregate: Description Language

- The Description Language Has Not Yet Been Finalized Among the Various Clusters.
- The Proposed Languages Are Fairly Similar, Most Are Based On XML
- The Control Framework Does the Allocation, iGENI Maps Calls Onto Its Addressable L1/L2 Path Infrastructure, Including Static, Semi-Dynamic and Dynamic Infrastructure

Building Experimental Networks

- Possible GENI Network Abstractions (Provided by Tools) For Experimental Resources
 - Automatic Path Discovery and Allocation
 - Control Over Path/Network Selection for Experimenter
 - Possibly Including Parameters, For Example, Bandwidth.
 - Bare Bones Control Over Everything Available to the ER Tools

iGENI As An Aggregate: Edge Addressing

- Edge Resources Will Use a Private Addressing Scheme.
- The Scheme Will Be Implemented Under Common Agreement Among Participants.
- The Addressing Will Be Incorporated Into the Description Language

iGENI As An Aggregate: Operations

- The Core Resource Infrastructure and The Experimental Research Infrastructure Will Be Operated By Distributed Operational NOC Processes
- Core Infrastructure Will be Addressed By a Management Plane Based on Common L3 Secure Channels In Addition To The Control Plane

Next Steps

- Initial Site ↔ Site Implementation
- StarLight ↔ RENCI
- Planning Has Been Initiated for Both Sites
- Prototype/Model for Other Instantiations
- Possible Demonstration of Initial Implementation in March 2010 at GEC