



## OnTimeMeasure: Centralized and Distributed Measurement Orchestration Software

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- Project Goal:
  - Provide GENI community with a shared measurement service for provisioning on-going and on-demand measurement requests
    - To be deployed on testbeds aimed at “clean-slate” re-design of the Internet to overcome limitations of current Internet
    - E.g., ProtoGENI testbed for Internet-scale research experiments, GENI Meta Operations (GMOC) that monitors GENI facility status
- Expected Outcomes:
  - OnTimeMeasure-GENI Software to perform centralized and distributed measurement orchestration and provisioning of active measurements
  - Measurement service that uses OnTimeMeasure software in GENI experiments to enable:
    - Network paths monitoring
    - Network weather forecasting
    - Network performance anomaly detection
    - Network-bottleneck fault-location diagnosis
- For project details, please visit:
  - GENI Project Wiki – <http://groups.geni.net/geni/wiki/OnTimeMeasure>
  - Researcher Web-portal – <http://ontime.oar.net>

# Milestone & QSR Status

ID	Milestone	Status	On Time?	On Wiki?	GPO signoff?
OnTime: S2.a	OnTimeMeasure for ProtoGENI - v1.0 High-level Design Document	Document written and released; on-going revisions based on GIMA discussions	Yes	Yes	Yes
OnTime: S2.b	PoC for response and escalation group	Sent to GPO Liaison	Early	Yes	Yes
OnTime: S2.c	Platform setup for OnTimeMeasure v1.0 software development, testing and deployment	Development and deployment platform setup and documented with RSpec, etc.	Yes	Yes	Yes
OnTime: S2.d	Demonstration of basic OnTimeMeasure functionality at GEC7	Demo at GEC7 reception, poster published	Early	Yes	Yes
OnTime: S2.e	OnTimeMeasure v1.0 release for early experimenters – demo at GEC8	Software released with tutorial, installation wiki, demo at GEC8 reception	Yes	Yes	Yes
OnTime: S2.f	Report on experiences with implementing and using OnTimeMeasure on ProtoGENI; evaluate integration with other projects	ProtoGENI experiences document written; integration instructions written for PlanetLab and InsTools	Early	Yes	Pending
OnTime: QSR1	QSR: 4Q2009	Published on GENI project wiki	Yes	Yes	Yes
OnTime: QSR2	QSR: 1Q2010	Published on GENI project wiki	Yes	Yes	Yes
OnTime: QSR3	QSR: 2Q2010	Published on GENI project wiki	Yes	Yes	Yes

# Accomplishments 1: Advancing GENI Spiral 2 Goals

- Instrumentation and Measurement
  - Release and active support of OnTimeMeasure v0.1 measurement service software for early experimenters: GPO, GMOC, Instrumentation Tools, Experiments Security Analysis, Digital Object Registry, Davis Social Links, Data Plane Measurements
  - Participated in GENI I&M WG meetings/workshops; collaborated with other project participants; contributed substantial write-ups in the GENI I&M Arch. v0.5 document
- Continuous Experimentation
  - Worked with ProtoGENI tools to create several slices that were active for several days/months – nodes both at local sites and geographically distributed locations
  - Reported bugs, suggested improvements and documented experiences in using ProtoGENI to develop and deploy OnTimeMeasure
- Integration and Interoperability
  - Demonstrated OnTimeMeasure can be used on both ProtoGENI and PlanetLab
  - Integrated data collection and analysis of OnTimeMeasure with InsTools
- Security
  - Discussed “Policy Authority” issues in OnTimeMeasure with other GENI project teams, and thus contributed to the on-going discussions on privacy and security requirements for data measurements in GENI

## Accomplishments 2: Other Project Accomplishments

- Attended GENI Experimenters Workshop; wrote GENI experiment proposal that NSF recently funded (<http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1050225>)
  - Title: “Thin Client Performance Benchmarking based Resource Adaptation in Virtual Desktop Clouds” ; GENI experiment requires many OnTimeMeasure features
- Recipient of the NSF REU funding through GPO to mentor an undergraduate student by engaging the student in the R&D activities of OnTimeMeasure
- Leading an effort with participants from The Ohio State University (OSU), OARnet, MERIT, NLR, StarLight, RENCi, and Wayne State University (WSU) to establish L2/L3 connectivity between the KanseiGenie testbed at OSU, NetEye testbed at WSU and the ORCA clearing house at RENCi
- PI was organizing committee member for GENI QUILT Workshop; presented a talk at the workshop on Kansei L2/L3 connectivity efforts
- Successfully deployed OnTimeMeasure on PlanetLab Aggregate
- Demonstrated early integration with InsTools project at GEC8
- Working with GPO to integrate OnTimeMeasure for OpenFlow measurements



- Need more interactions to obtain I&M requirements and feedback from GENI researchers who run experiments relating to network science and engineering
- Need GIMA document to be completed in order to better understand how to integrate and interoperate with other GENI I&M services
- Need a measurement archive capability in GENI to store user measurements (if and when requested by user), and GMOC meta-data records
- Need a consensus for a common schema for request/response of measurement data and metadata in GENI
- How will Solicitation 3 I&M proposal responses be evaluated, and how will that process affect the Spiral 3 projects planning?

- Plans for the remainder of Spiral 2
  - Improve installation procedure of OnTimeMeasure and make it more automated
  - Release a command-line tool that uses XML-RPC messages to perform all the measurement service functions between client-and-server currently being done interactively with researcher web-portal (<http://ontime.oar.net>)
    - Provides capability for integration with experiment workflow tools such as GUSH
  - Miscellaneous bug fixes, and improved documentation in code and user manual
- Potential Spiral 3 work
  - Automate experiment and I&M topology extraction using RSpec and RSpec extensions for easier setup of corresponding resources
  - Implement “Policy Authority” module in OnTimeMeasure that addresses security and privacy issues of data measurements in GENI
  - Enhance OnTimeMeasure features by working with network science and engineering experimenters, e.g., thin-client based virtual desktop clouds
  - Extend OnTimeMeasure to orchestrate measurements from other data sources such as additional active measurement tools (e.g., Pathchar), OpenFlow switches, and network taps for passive measurement
  - Integrate with other I&M projects such as S3, Digital Object Repository, Kansei Doctor of KanseiGenie, GMOC and Data Plane Measurements as part of the efforts to deliver an integrated GENI I&M system by end of Spiral 3