OnTimeMeasure Capabilities for GENI Experimenters

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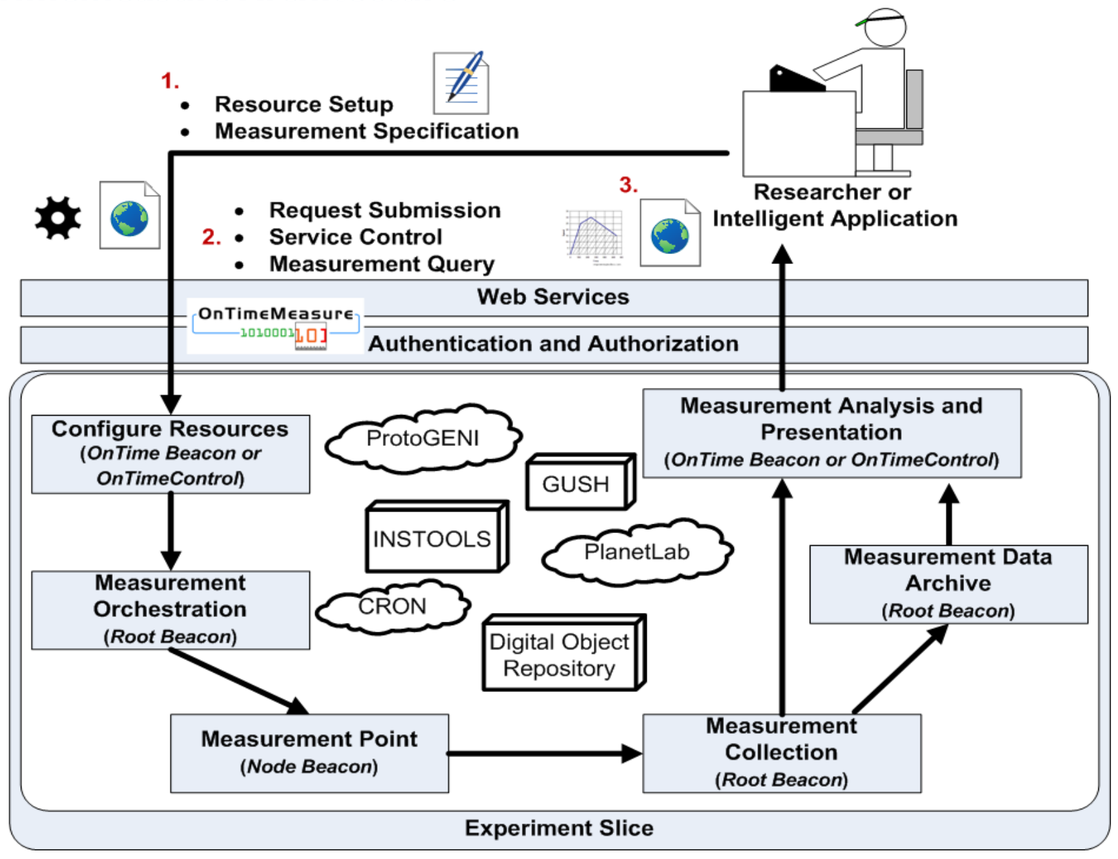
Project Overview

- **Goal:** Provide GENI community with capabilities for provisioning on-going and on-demand measurement requests
  - Used in forecasting, anomaly detection, and fault-location diagnosis in GENI experiments and GENI operations

Outcomes:

- *Software* to perform centralized and distributed measurement orchestration and provisioning of measurements
  - *Centralized orchestration* for continuous monitoring, persistent measurements storage and processed network measurement feeds
  - *Distributed orchestration* for on-demand (real-time) measurement requests without need for persistent measurements storage
- *Measurement service* that enables users to utilize OnTimeMeasure software in GENI experiments
  - Registers users, slices, maintains meta-data, and allows user control of measurement service functions
    - Researcher Web-portal – http://ontime.oar.net for *interactive user control* of measurement service
    - Command-line tools for measurement service *control automation*

OnTimeMeasure Architecture



What OnTimeMeasure can provide Experimenters

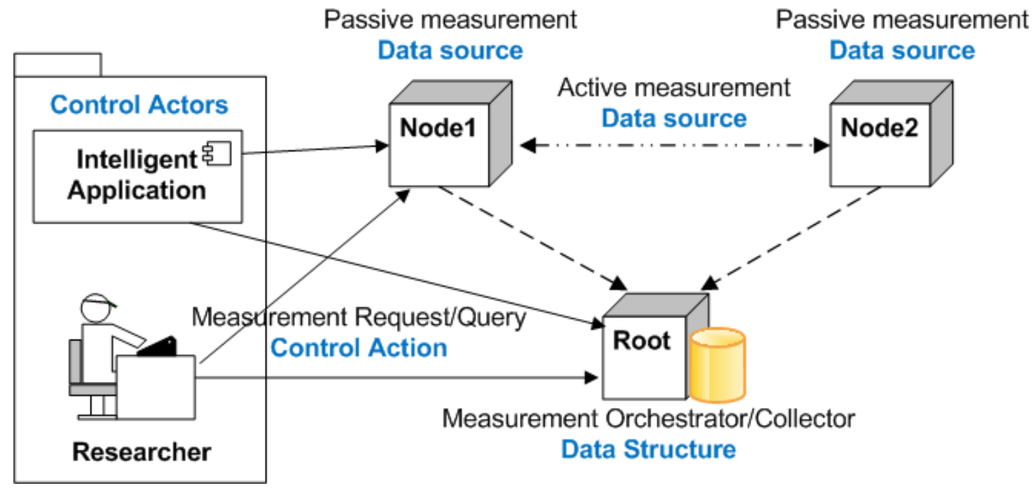
- **Data Aggregation**
  - Your distributed data sources can be controlled and accessed (start/stop/query) in a centralized manner via web-portal or command line
- **Data Visualization**
  - Measurement data graphs, dashboards
- **Data Analysis**
  - Time Series with Anomalies/Time Series with Forecasts/others
  - Ability to use analysis of the measurements to reconfigure the measurement specifications without human intervention
- **Data Archive**
  - Slice owners can access and download data and metadata
- **Integration with other GENI projects to extend OnTimeMeasure functionality for Experimenters:**
  - OnTimeMeasure-ProtoGENI, OnTimeMeasure-PlanetLab - I&M service for GENI aggregate users
  - OnTimeMeasure-Gush - I&M service control through Experimenter workflow tool
  - OnTimeMeasure*-INSTOOLS** - Both active* and passive** measurements in experiment slice
  - OnTimeMeasure-CRON - I&M service for 10Gbps network path experiments
  - OnTimeMeasure-DOR – I&M Data Archive service

GENI Experiment Case Studies

- Case Study I: "Resource allocation in virtual desktop clouds" led by The Ohio State University
  - Path-based measurements of network health such as delay, available bandwidth, loss
  - Host-based measurements from VMware tools such as CPU, memory, number of VM connections
- Case Study II: "Emulating cloud dynamics for performance sensitive applications" led by Purdue University
  - Path-based measurements of network health such as delay
  - Host-based measurements from tshark such as packet sizes for HTTP sessions

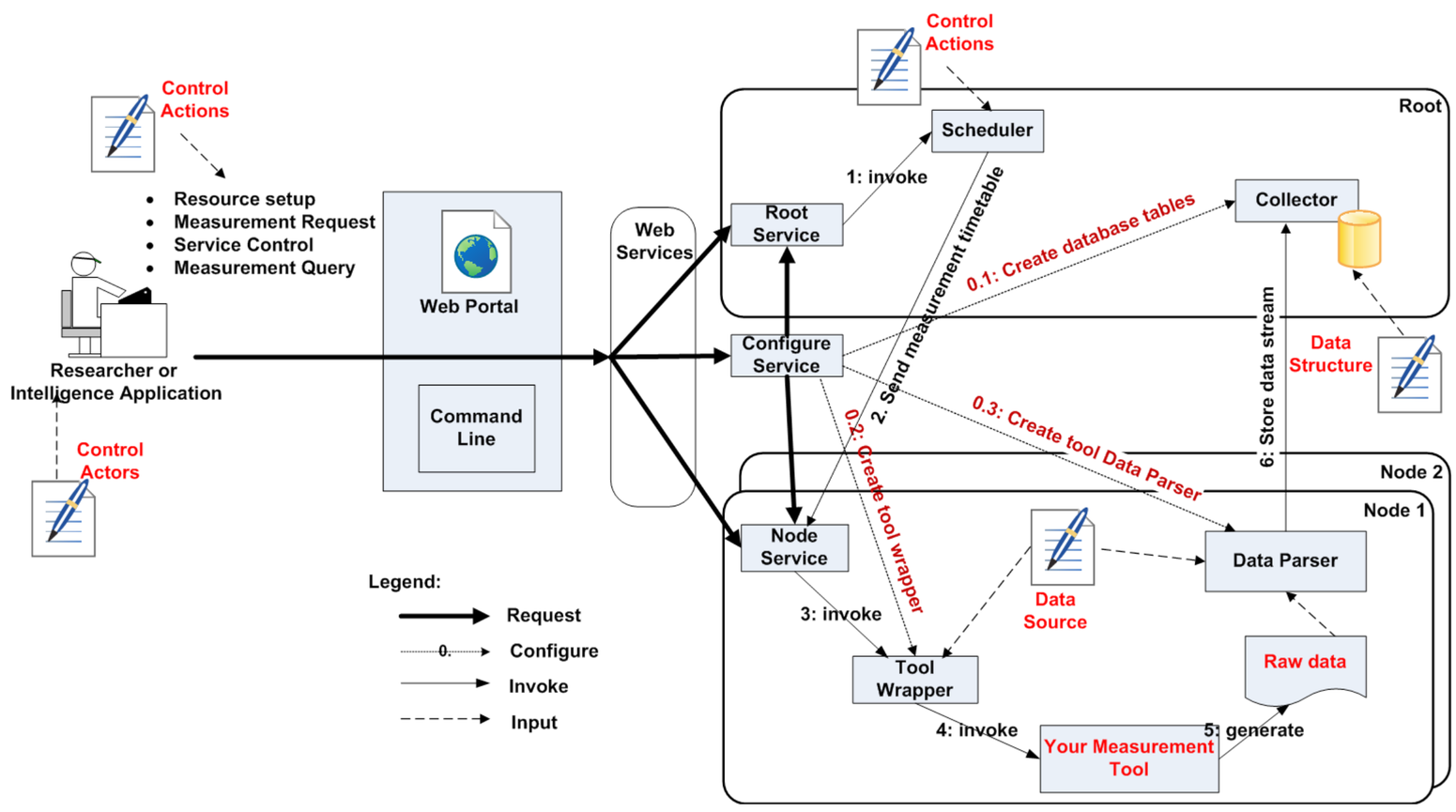
Experiment Information needed for OnTimeMeasure Integration

- **- Control Actors**
  - Project members or your research application that would access the data or share the data with other actors
- **- Data Sources**
  - Data generation tools deployed in slice nodes; the tool would communicate with other nodes to perform active measurements or inherently collects passive measurements in on-going and on-demand manners
- **- Data Structures/Data Types**
  - Measurement data would be stored in a data base with proper data structure and data types
- **- Control Actions**
  - Control start and stop of the data generation tool, control how to retrieve and utilize the data e.g., dashboard, plot, time series file with anomaly annotation



NOTE: To integrate new measurement metrics of Experiments in OnTimeMeasure, we need information about your **Control Actors, Data Sources, Data Structures/Data Types, and Control Actions**

Customization Points within OnTimeMeasure



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