

KanseiGenie:
GENI-fying and Federating
Autonomous Kansei Wireless Sensor Networks

Spiral 1 – Annual Report

Technical Contact:

Anish Arora

Professor, Department of Computer Science and Engineering

Co-founder, Institute of Sensing Systems

Ohio State University

anish@cse.ohio-state.edu

www.cse.ohio-state.edu/~anish

395 Drees Laboratories

Columbus, OH 43210-1277

+1 (614) 264-8771

+1 (614) 292-2911 (fax)

1. Major accomplishments

- We have refactor-ed Kansei to generate KanseiGenie that is compatible with the GENI and ORCA control fraemwork
- We have integrated KanseiGenie with the ORCA control framework
- We have demonstrated the successful refactoring of Kansei as well as the integration of KanseiGenie with ORCA at various GECs
- We have opened KanseiGenie for external, public access, and KanseiGenie has supported more than 400 experiments since 2008
- We have released the version 1 of KanseiGenie software installer package

2. Milestones achieved

- KANSEI: 1a Import a GENI-compliant control framework based on ORCA
 - Done
- KANSEI: 1b Establish Kansei testbed clearinghouse
 - Done
- KANSEI: 1c Refactor Kansei researcher portal
 - Done
- KANSEI: 1c2 Integrate Kansei researcher portal
 - Done
- KANSEI: 1d1 Refactor Kansei component and aggregate managers
 - Done
- KANSEI: 1d2 Integrate Kansei component and aggregate managers-
 - Done
- KANSEI: 1f Demo basic virtualization and experiment control functions
 - Done
- KANSEI: 1g Open Kansei testbed to GENI users
 - Done

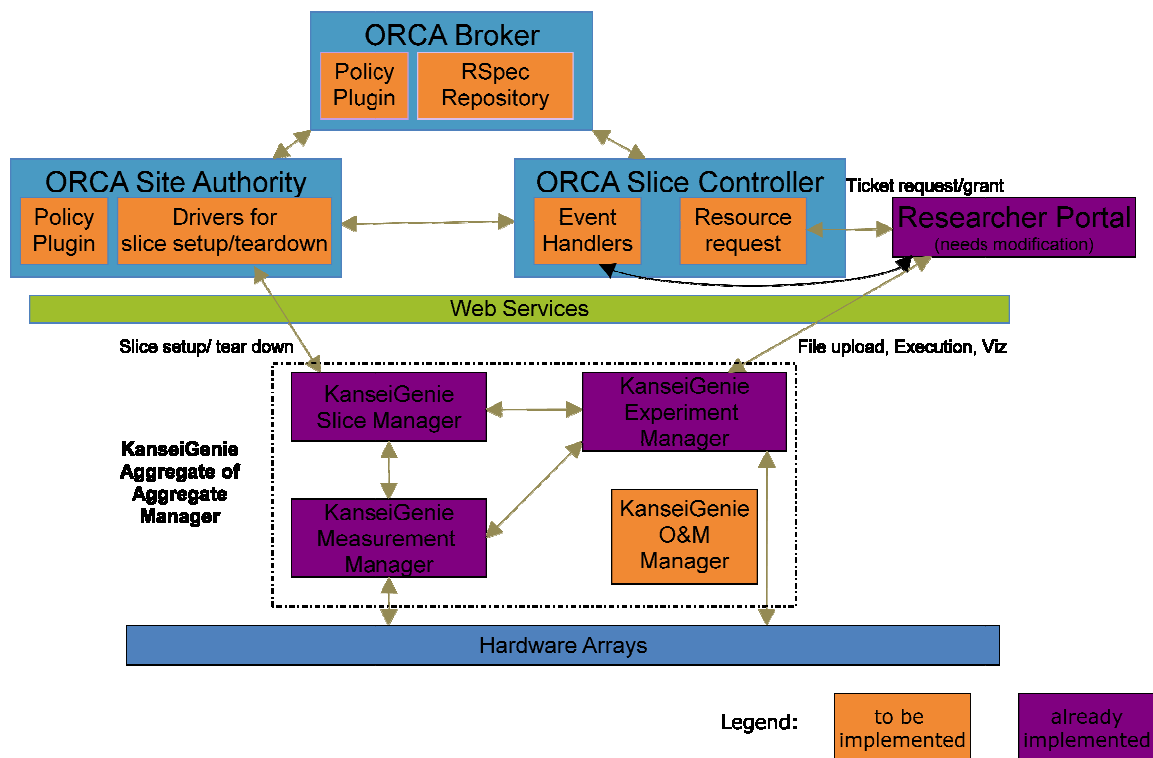
3. Deliverables made

1. Various detailed documentation on Spiral 1 efforts are available at: <http://sites.google.com/site/siefastgeni/documents-1>
2. Opened public access to KanseiGenie: <http://kansei.cse.ohio-state.edu/KanseiGenie/>
3. Version 1.0 of KanseiGenie software installer package: <http://kansei.cse.ohio-state.edu/KanseiGenie/downloads/index.php>

4. Description of work performed during Spirial 1

We have accomplished the spiral 1 objectives of KanseiGenie by working on various aspects of KanseiGenie architecture, researcher portal, KanseiGenie site managers, and KanseiGenie clearinghouse. In what follows, we summarize our work in the aforementioned three aspects.

- Summary of accomplishments at researcher portal:
 - ORCA-fied/GENI-fied KanseiGenie architecture:



- Completed baseline integration of KanseiGenie clearinghouse with ORCA broker
- Completed baseline integration of KanseiGenie research portal with ORCA slice controller
- Completed baseline integration of KanseiGenie slice manager with ORCA site authority
- Finished design of refactoring KanseiGenie injection service based on SMS etc.
- Finished refactoring the pursuer-evader demo based on new Kansei design and implementation

- Summary of accomplishments at researcher portal:
 - Decoupled the Portal from the Site and re-implemented Researcher Portal to work with web services
 - Integrated Portal with ORCA for resource reservation
 - Separated and bunched user-services and created Dashboard

- Summary of accomplishments at KanseiGenie site managers:
 - Implemented each of the four control planes in GENI in a corresponding KanseiGenie manager at the Site Authority
 - Managers capture the primitive operations of KanseiGenie, enabling higher level applications to be built on top
 - All primitive operations are exposed as web services through the open source JBoss application server
 - A profile feature, which enables researchers to repeat previously scheduled experiments easily, is added to the experiment manager
 - The interaction with the underlying hardware sensor arrays is enabled and persisted through shared access to database tables

- Summary of accomplishments at KanseiGenie clearinghouse:
 - Implemented basic user-authentication, user-authorization, and resource discovery as well as allocation mechanisms at clearinghouse;
 - Deployed ORCA at Wayne State University using the tar-ball release from RENCi;
 - Setup the master machine for ORCA's cluster-on-demand (COD) manager, and emulated the GENI-fied resource management mechanisms in ORCA;
 - Customized KanseiGenie broker: developing and establishing the sensornet/KanseiGenie specific local inventories in broker, and developing basic resource allocation policies;

- Deployed KanseiGenie broker in a distributed container, and integrated it with the site authority and service manager running at The Ohio State University;
- Upgraded ORCA actors to support secure SOAP messaging;
- Moved KanseiGenie broker to RENCi's clearinghouse, and deployed it in the container of the "jail" machine;
- Read and led discussions on ITU T-G.805/G.809, with a special focus on its relation to wireless sensor network RSpec;
- Conducted preliminary test of KanseiGenie ver1 installation package.

5. Project participants

Investigators:

[Anish Arora](#)

[Rajiv Ramnath](#)

[Hongwei Zhang](#)

[Vipul Gupta](#)

[Sami Ayyorgun](#)

Staff:

[Mukundan Sridharan](#)

[Wenjie Zeng](#)

Xi Ju

6. Publications (individual and organizational)

A book chapter describing KanseiGenie will appear in the book "Next-Generation Internet Architecture and Protocols".

7. Outreach activities

- Presentations to a delegation of female Ph.D. students from the mid-east, May 2009 (Wayne State University)
- Allowed open access for researchers/students at various institutions such as Michigan State University, SUNY-Buffalo, Ohio State University, and Wayne State University.

8. Collaborations

- Collaborate with Cluster-D projects to identify integration strategies with ORCA control framework
- Collaborate with Cluster-D teams to identify the Spiral 2 objectives and strategies for the cluster

9. Other Contributions

We have contributed to the following GENI Working Group activities:

- Providing feedback to the GENI Control Framework Requirements
- Giving presentations and demos at GEC3, GEC4, and GEC5