KanseiGenie Federation
Status and RoadMap

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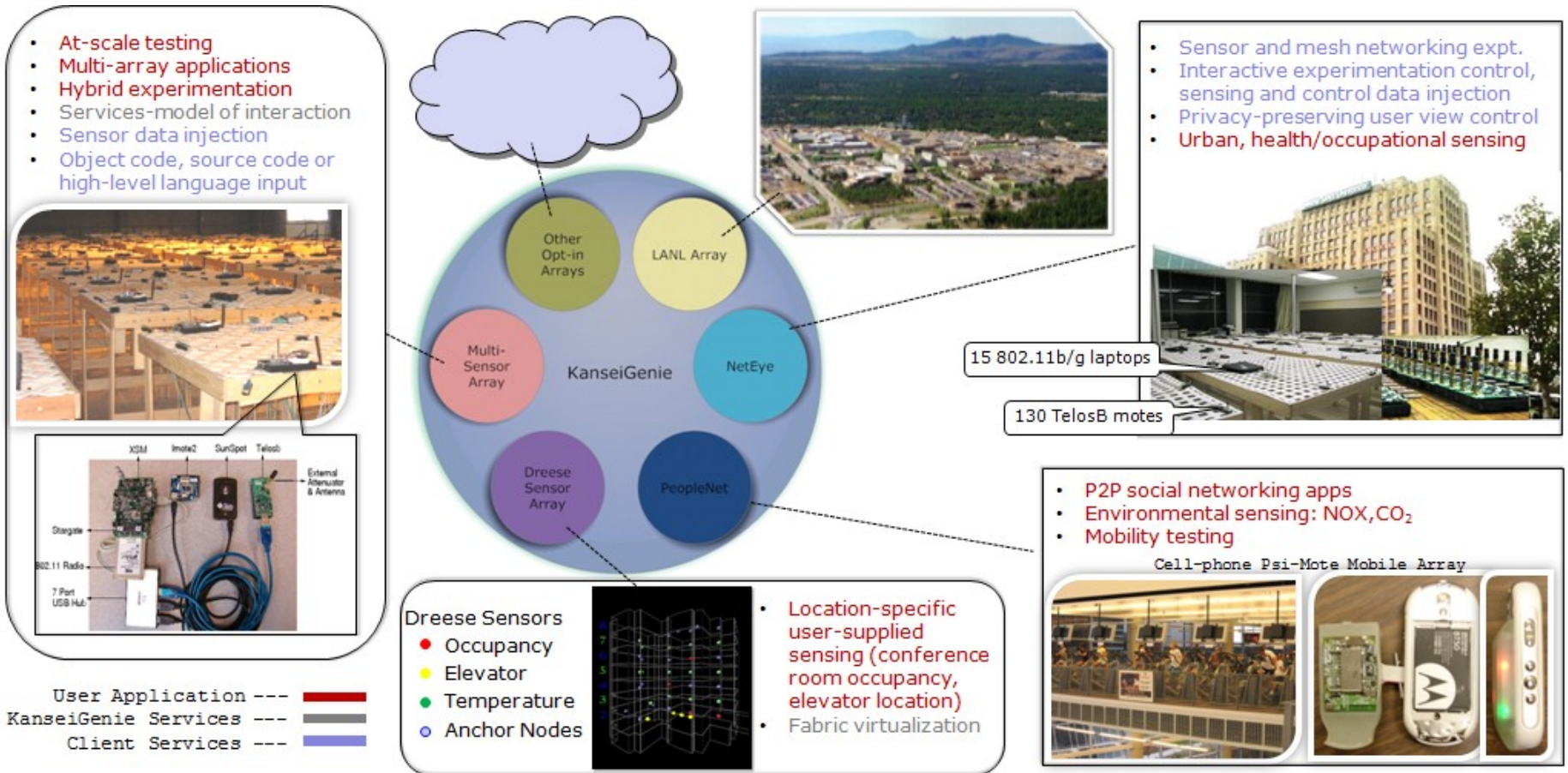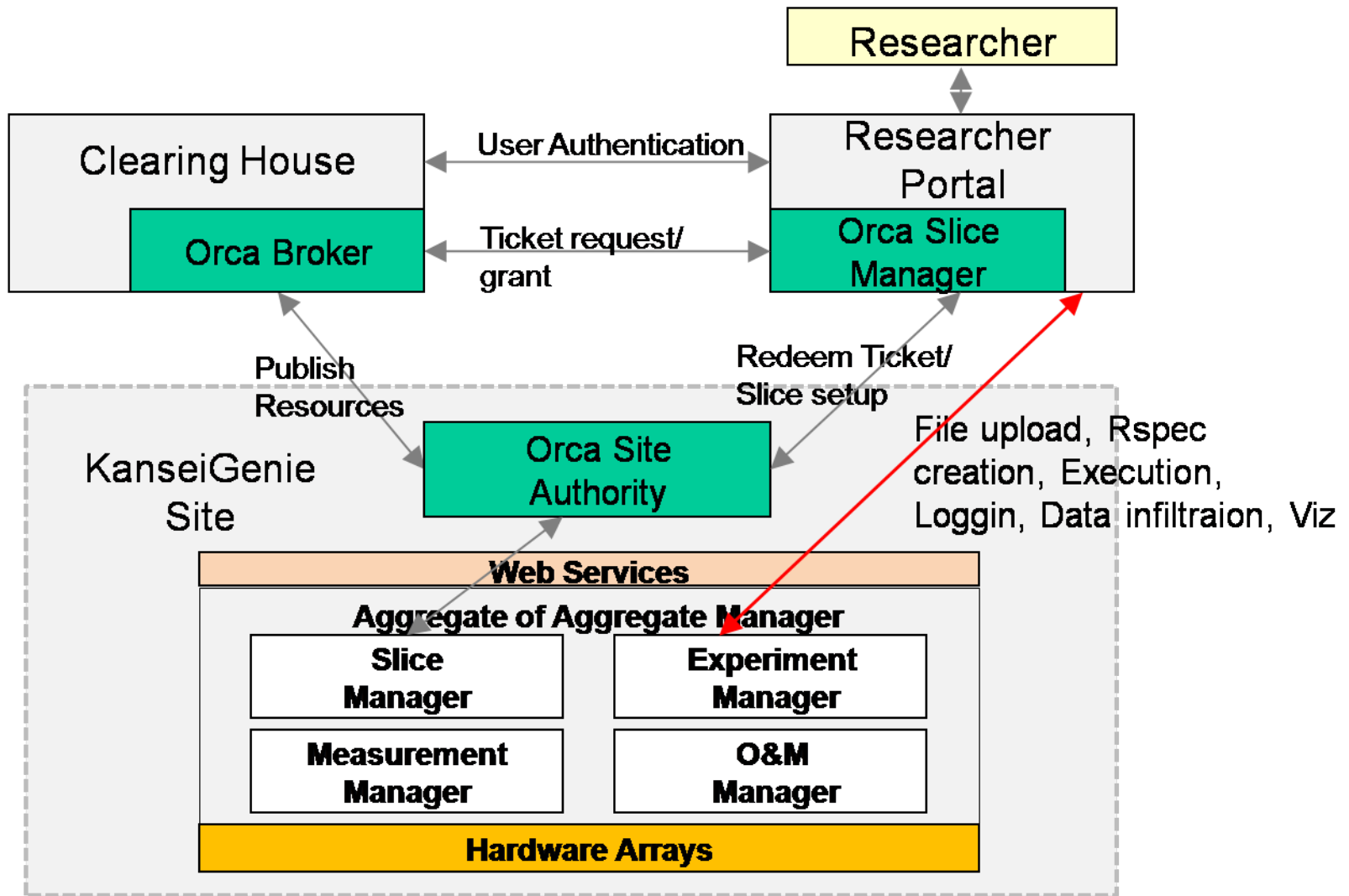
KanseiGenie Overview

Nomenclature

- KanseiGenie: Architecture and Software suite

- Substrate or fabric: An array or set of same type of motes/sensor

- Kansei: Name of the testbed at Ohio State

  - Includes 5 different substrates

- NetEye: Name of the testbed at Wayne State

  - Includes 2 substrates

- KanseiGenie Consortium: A group of testbeds which use the KanseiGenie software and can be accessed through a single Portal

- Current deployments: Ohio State, Wayne State, Oklahoma State

- Future (possible) deployments: LANL, India, Japan

KanseiGenie Overview

- At-scale testing
- Multi-array applications
- Hybrid experimentation
- Services-model of interaction
- Sensor data injection
- Object code, source code or high-level language input

- Sensor and mesh networking expt.
- Interactive experimentation control, sensing and control data injection
- Privacy-preserving user view control
- Urban, health/occupational sensing

15 802.11b/g laptops

130 TelosB motes

- P2P social networking apps
- Environmental sensing: NOX, CO_2
- Mobility testing

Cell-phone Psi-Mote Mobile Array

Other Opt-in Arrays

LANL Array

Multi-Sensor Array

KanseiGenie

NetEye

Dreese Sensor Array

PeopleNet

Dreese Sensors
- Occupancy
- Elevator
- Temperature
- Anchor Nodes

- Location-specific user-supplied sensing (conference room occupancy, elevator location)
- Fabric virtualization

User Application ---
KanseiGenie Services ---
Client Services ---

# KanseiGenie Architecture

KanseiGenie Sites (Porting)

- NetEye (Wayne State University)

  - Xi Ju

- OKGems (Oklahoma State University)

  - Praveen Kumar

Demo Scenario

- Running a single experiment across two sites (homogeneous substrate)

    - Both Sites publish resources to the same Broker

    - Portal is creates RSpecs for both sites and sends lease request to the Orca Service Manager

    - Service manager gets two separate tickets from broker and redeems them with the Sites

    - After redeeming the request, the sites setup the slice

    - User can start the experiment from the Portal on both sites

    - After experiment is done the results are available at the Portal for download

Stage-1 Federation Architecture
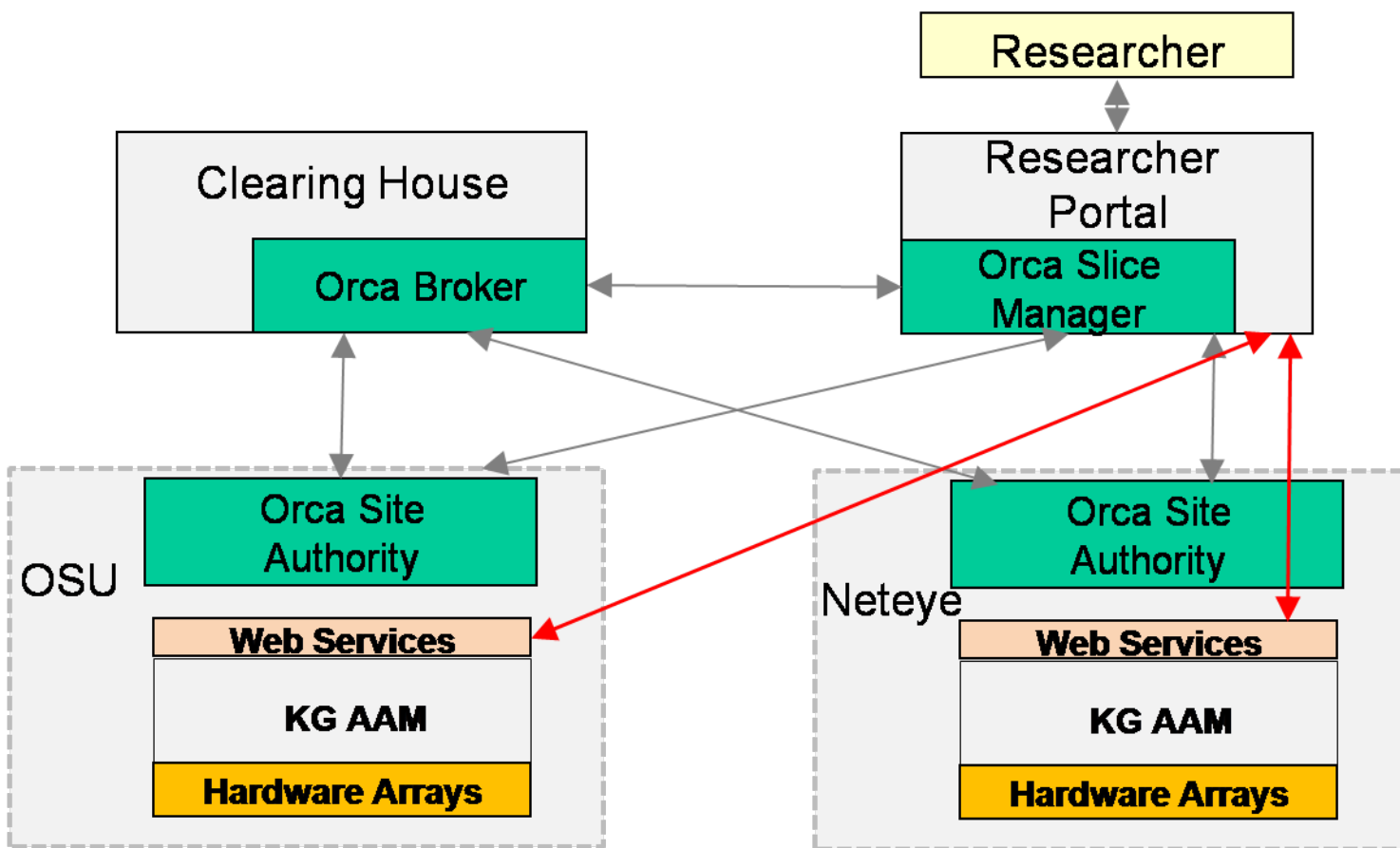
Spiral 2 Progress till now

1. Created v1.1 KanseiGenie Installer

2. Ported KanseiGenie to NetEye (Wayne State), and provided support to porting efforts at OKGems (Oklahoma State)

3. Extended KanseiGenie Researcher Portal to include baseline federated experimentation

4. Completed development to make the switch form Soap to SecureSoap.
   - New version will be rolled out after GEC7.

5. Started planning v2.0 of software installer package, including baseline federation

Milestones Completed:

KANSEI: S2.d Extend researcher portal for use with Kansei and NetEye (Due 3/16/10)

KANSEI: S2.e Bring up NetEye testbed at WSU (Due 03/16/10)

KANSEI: S2.f Connection plan from Kansei and NetEye to Internet2 (Due 03/16/10)

KANSEI: S2.h Demo experiment using Kansei and NetEye (partially done; Due 07/20/10)

NLR Connection

- OSU

  - Layer 3 (I2) connection to KG Site– in process

    - 240/month

  - Layer 2 – in process

    - KG Site-RENCI

      - Via OIT-Oarnet-MERIT-OMNIpop-Starlight-NLR-RENCI (most feasible)

    - KG Portal to KG Site (Static VLAN)

    - $100/month

    - Paul Schopis (CTO Oarnet)

- WSU

  - L3 (I2) connection available: no cost

  - L2 costs unaffordably high: ~30K/year

  - WSU to KG Site L3 Tunnel (IPSec)

Spiral 2 Roadmap

1 Basic federated resource discovery and scheduling

   i   RSpec (NDL) based resource discovery and leasing jointly with ORCA-BEN and Cluster D

2 Extend KanseiGenie Researcher Portal

   i   Support slice stitching across multiple sites

   ii Online Experiment interaction and Viz service

3 Realize v2.0 KanseiGenie Installer

   i   Accommodate new substrate(s)

   ii Support Federation

4 Work on more federation use cases with other GENI members

5 Support other groups who use our software and open users

Milestone Due:

KANSEI: S2.g Import extended ORCA v2.1 (Due 07/20/10)

KANSEI: S2.h Demo experiment using Kansei and NetEye (Due 07/20/10)

KANSEI: S2.l Contribution to GENI outreach (Due 08/31/10)

Other Initiatives

- Create *KanseiLite* software package for tabletop testbeds

- Support experiment workflow management for federated slices (Portal)

- Experiment Specification/Scripting language support (Portal)

- Establish international WSN federations

    - Japan: X-Sensor team (4+ institutions, 8+ testbeds)

    - India: IISc

Potential Experiments

- ## Single site

  - Communication between experiment and opt-in user through data hub

  - Portal-Slice real-time communication

- ## Federated experimentation

  - Two sites real-time communication (Kansei-NetEye)

  - Heterogenous multi-substrate ex

- ## DieselNet-Kansei federated experimentation?

  - Capacity/delay trade-offs

  - End-to-end application testing and closing the loop

Thank you

Questions?