



# On the Framework for Network Measurement as a Service

perfSONAR-based Integrated Network Management

NICT/JGN2plus Service Platform Architecture Research Center

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Kyushu Institute of Technology Network Design Research Center



# Network measurement



- ◆ For what?
  - to maintain reliability and quality
  - to achieve dynamic resource allocation
- ◆ For ISP
  - Trouble-shooting, security management
  - SLA, user profile, accounting, ..
  - TE, performance tuning, provisioning
- ◆ For Application, User
  - Trouble-shooting,
  - App- (overlay-) TE, performance tuning

# Network measurement (cont.)



## ◆ What to measure?

- E2E performance/quality: experienced by individual user (application) data flows
- Local/Global network status/properties

## ◆ E2E performance

- Loss, delay, throughput, ...
- Mainly by active measurement

## ◆ Network status

- Local loss, delay, bandwidth, utilization, ...
- Route, Traffic Matrix, Flow statistics
- Mainly by passive measurement & SNMP

# Network measurement (cont.)



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## ◆ Requirements for measurement

- Scalability -> Efficiency, Distributed
- Diversity -> Adaptability, Deep analysis
- Usability -> Good standard interface, API

## ◆ Approaches

- Measured/analyzed data sharing/reuse
- Analysis on multiple-location (multiple-domain), long-term, and multiple-property measurements
- Network measurement as a Service

## ◆ Solution

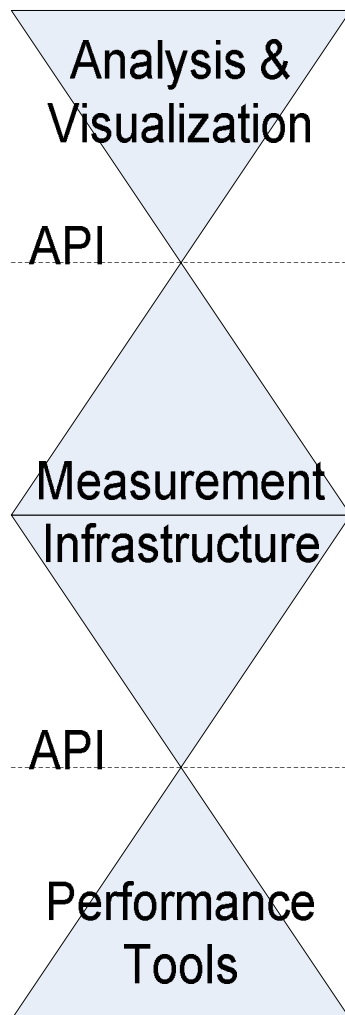
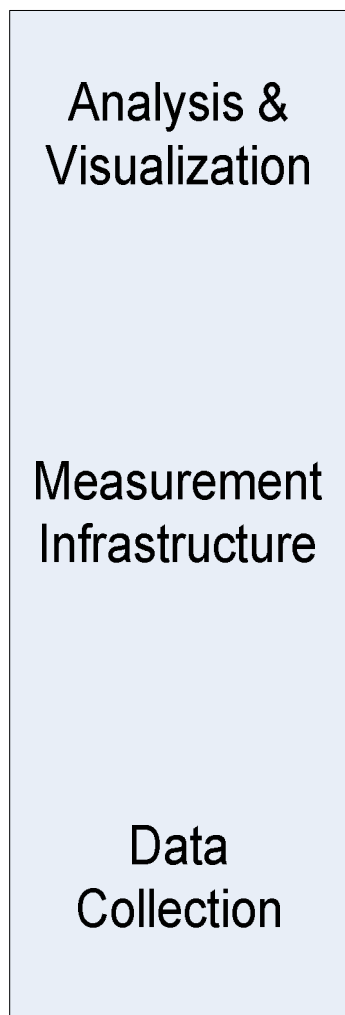
- perfSONAR-based Integrated Network Management Platform



# perfSONAR



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- ◆ PERFORMANCE Service Oriented Network monitoring Architecture
  - OGF (Open Grid Forum) NM-WG (Network Measurement Working Group) standard for measurement information exchange
  - Architecture for mapping various measurement tools and various analysis/user visualizations
  - Modularity for flexibility
  - INTERNET2 Perl version and GEANT2 Java version



"perfSONAR Architecture: Design, Usage, Extension and Next Steps"

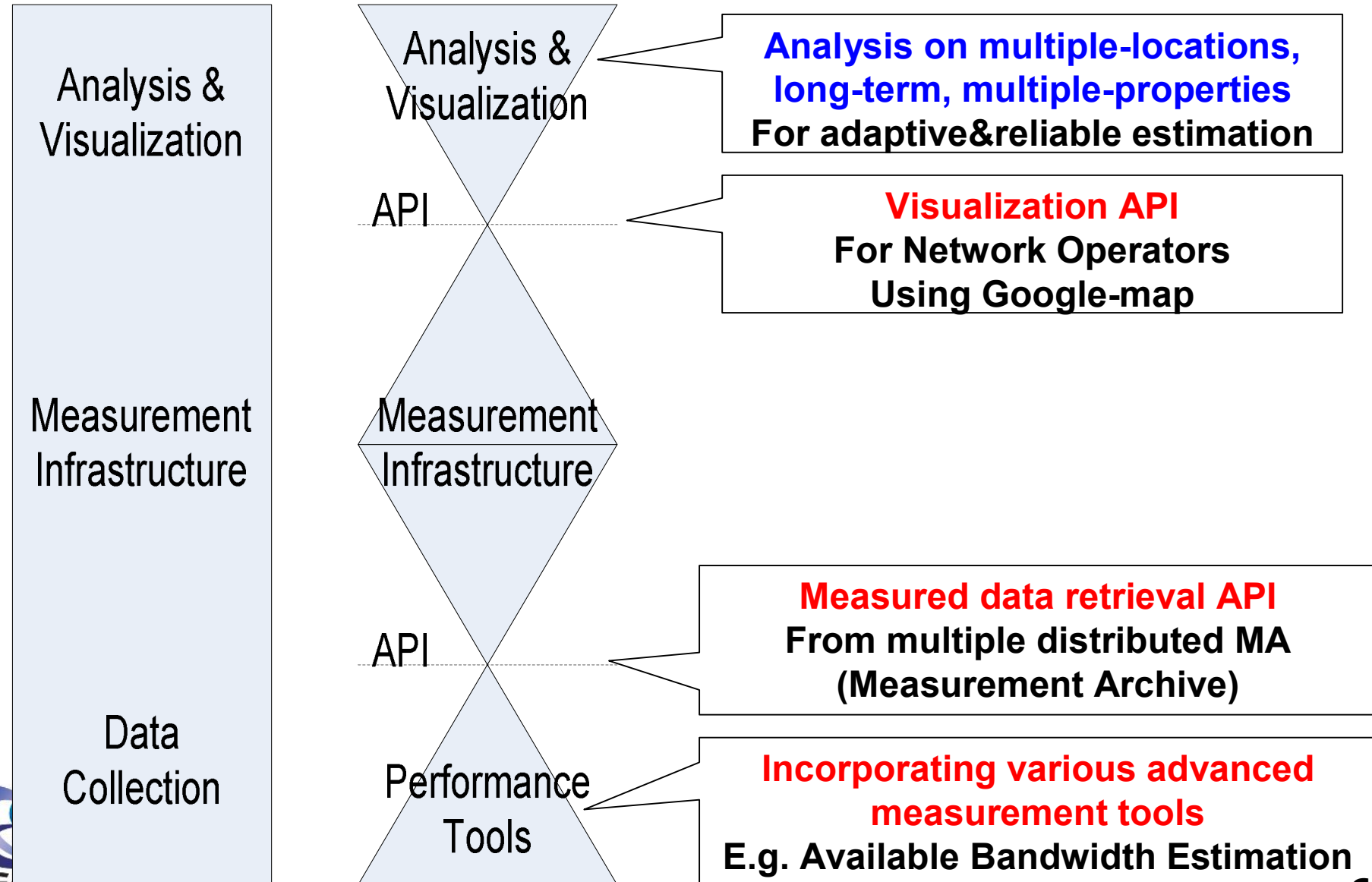
JGN2  
plus

Presented by Prof. Martin Swamy, 05 August 2008, 26th APAN Conference, Queenstown, New Zealand

# Our R&D Design on perfSONAR



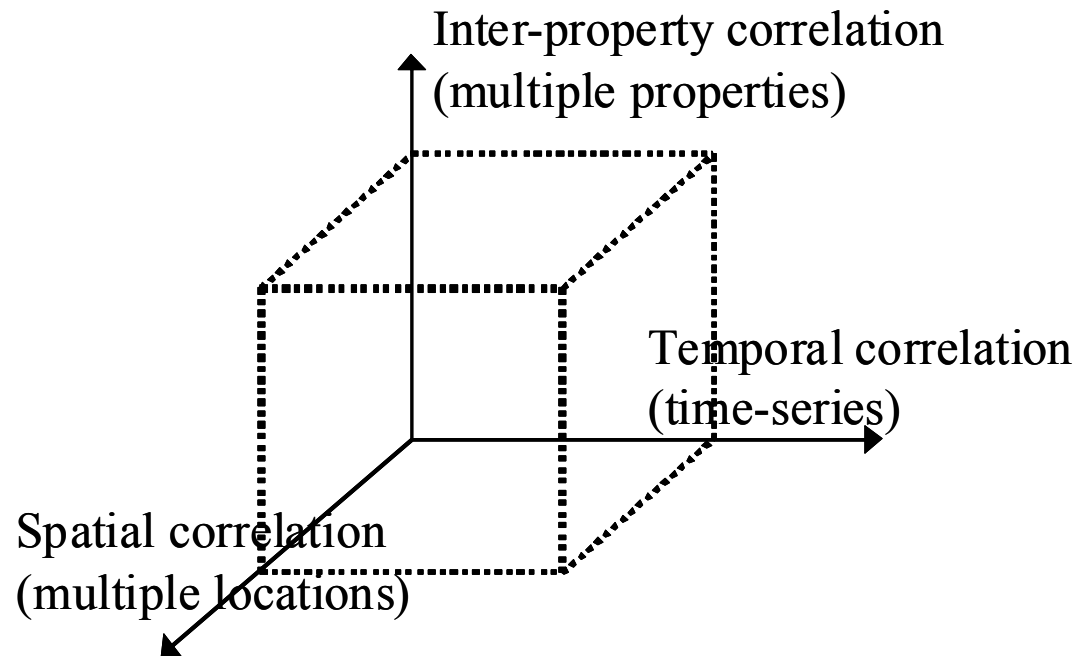
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# Analysis on Multiple Data



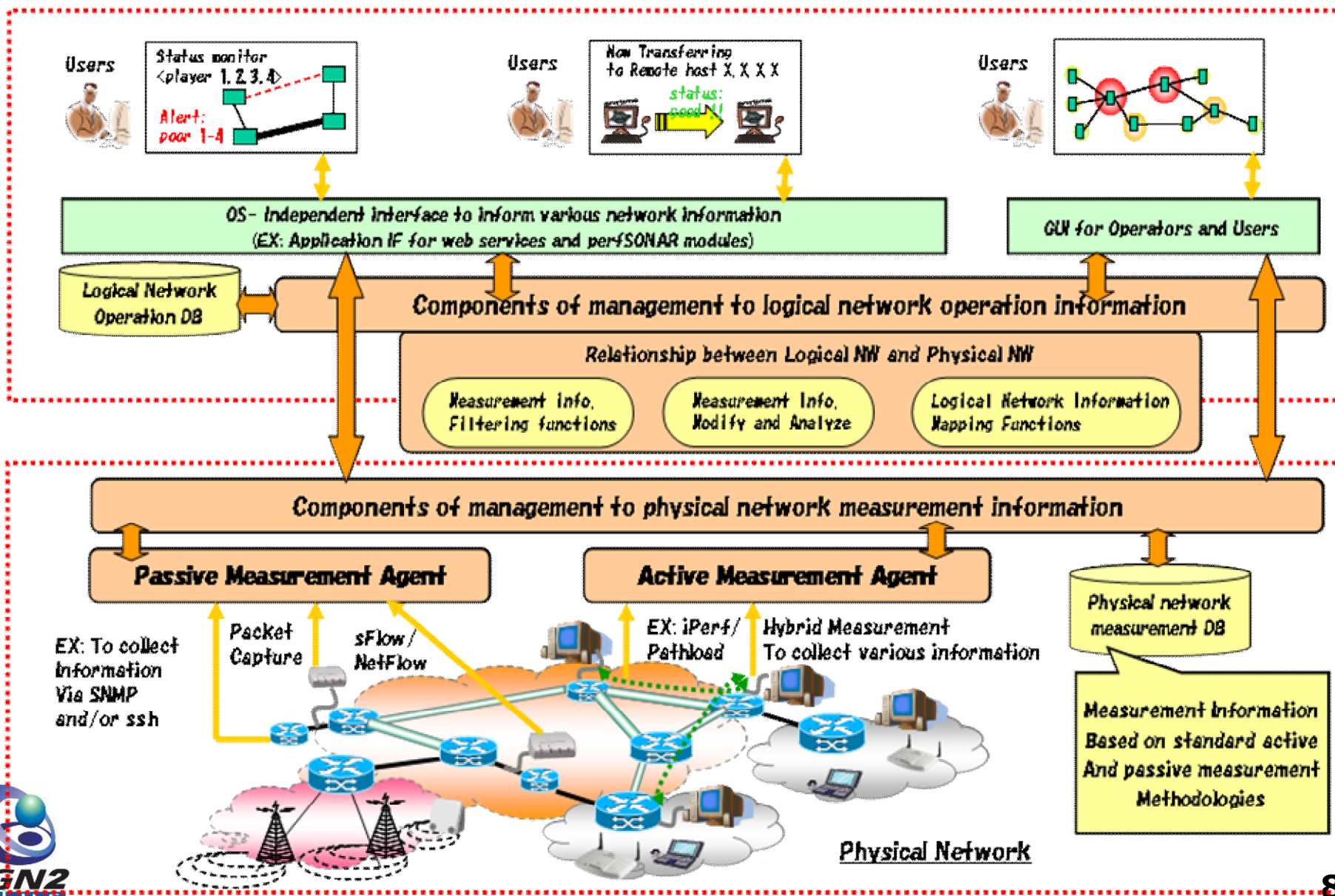
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Integrated deep Analysis on data measured at multiple locations, for long-term, and on multiple properties

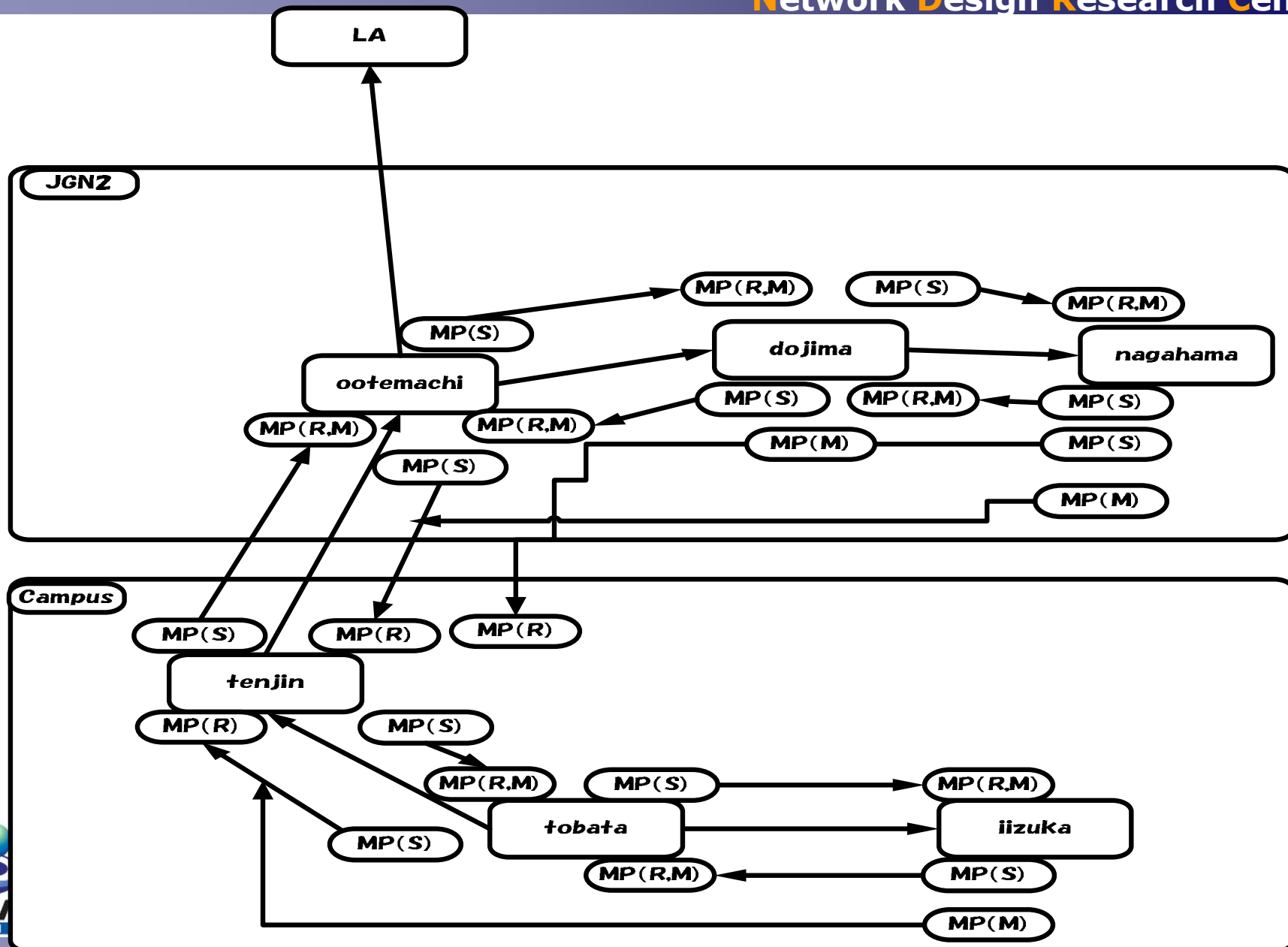
- ✓ Spatial correlation: Network tomographic location identification
  - e.g. Simultaneous estimation on **available bandwidth of multiple paths**
- ✓ Temporal correlation: Change detection
- ✓ Inter-property correlation: e.g. Loss rate estimation by delay monitor
- ✓ Total correlation: ? -> New challenge

# Architecture Overview





# Network Measurement Point



# Demonstration for SC09



The screenshot displays the Network Crawler application interface. At the top, there are tabs for 'Network Crawler' and 'Traffic WeatherMAP for SC09'. The main window contains a table of nodes and a bandwidth usage chart.

Node	Type	Priority	Last	Count	Summary
Tenjin	pathchirp	5	06:45		bandwidth has exceeded thresholds (4.22<-60) target is Ootemachi
Tenjin	pathchirp	5	06:40		bandwidth has exceeded thresholds (44.33<-60) target is Ootemachi
Tenjin	pathchirp	5	03:40		bandwidth has exceeded thresholds (51.064<-60) target is Ootemachi

The interface also includes a map of California and Arizona, and a bandwidth usage chart for the pathchirp node between Ootemachi and Tenjin. The chart shows bandwidth usage over time, with a peak around 1000 units.



Thank you for your attention!