

REST Style Large Measurement Platform Protocol

draft-liu-lmap-rest-00.txt

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Outline

- **REST Style LMAP Protocol**
 - Control Protocol
 - Configuration Update
 - Instruction Assignment
 - Capacity and Status Feedback
 - Report Protocol
- **Running code & Deployment Case**

Background

- **LMAP Use Cases**
 - LMAP can be used to monitor network quality
 - IDC service Monitor/VIP customer monitor
 - LMAP can be used to optimize user experience
 - CDN acceleration effect
 - Network operation and maintenance
 - Enterprise network
- **draft-liu-lmap-rest-00 defines a REST style LMAP protocol**
 - Include both control and report protocol

Motivation

- **Why Use REST Style HTTP?**
 - REST: Representational State Transfer
 - Benefit of using REST
 - One of the best practices of using HTTP
 - Simple
 - Stateless
 - Clean design
 - Scalable
 - ...

- **REST Style Example**

- HTTP GET:

- **List** the URIs and perhaps other details of the collection's members.

- HTTP POST

- **Create** a new entry in the collection. The new entry's URI is assigned automatically and is usually returned by the operation.

- PUT

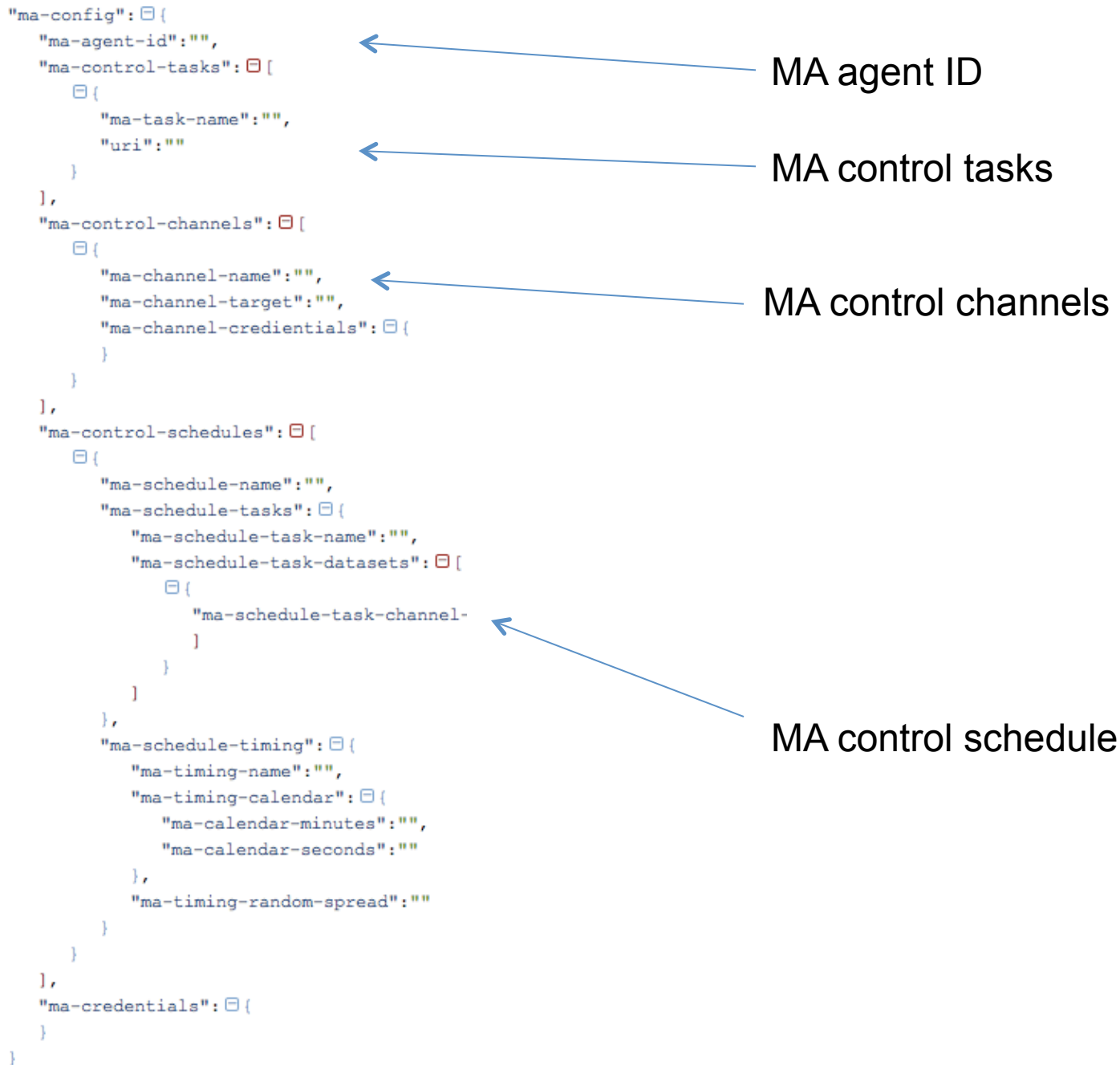
- **Replace** the entire collection with another collection.

- DELETE

- **Delete** the entire collection.

Rest Style LMAP Control Protocol

- **Configuration Update from Controller to MA**
 - PUT /ma/config/
 - Update the configuration from controller to MA
 - JSON format parameters
 - Align with LMAP information model



- **Instruction Assignment from Controller to MA**
 - POST /ma/ins/
 - Send measurement instruction from controller to MA
 - JSON format parameters
 - Align with LMAP information model


```
□ {
  "ma-task": □ {
    "ma-task-name": "", ← MA task
    "ma-task-registry": "",
    "ma-task-options": "",
    "ma-task-cycle-id": ""
  },
  "ma-schedule": □ {
    "ma-schedule-name": "", ← MA schedule
    "ma-schedule-tasks": □ [
      □ {
        "ma-task-name": "",
        "ma-task-registry": "",
        "ma-task-options": "",
        "ma-task-cycle-id": ""
      },
      □ {
        "ma-task-name": "",
        "ma-task-registry": "",
        "ma-task-options": "",
        "ma-task-cycle-id": ""
      }
    ],
    "ma-schedule-timing": □ {
      "ma-timing-periodic": "",
      "ma-timing-randomness": ""
    }
  },
  "ma-channel": □ { ← MA channel
    "ma-channel-name": "",
    "ma-channel-target": "",
    "ma-channel-certificate": "",
    "ma-channel-timing": "",
    "ma-channel-interface-name": "",
    "ma-channel-connect-always": ""
  },

```

```
  "ma-suppression": □ { ← MA suppression
    "ma-suppression-enabled": "",
    "ma-suppression-start": "",
    "ma-suppression-end": "",
    "ma-suppression-task-names": □ [
      □ {
        "task-name": ""
      },
      □ {
        "task-name": ""
      }
    ],
    "ma-suppression-schedule-names": □ [
      □ {
        "schedule-name": ""
      },
      □ {
        "schedule-name": ""
      }
    ]
  }
}
```

- **Capability and Status Feedback from MA to Controller**
 - GET /ma/capabilities
 - Get MA capabilities
 - GET /ma/failure
 - Get failure information
 - Get /ma/logging
 - Get logging information

Response of get capabilities

```
{
  "ma-status-and-capabilities": {
    "ma-agent-id": "",
    "ma-device-id": "",
    "ma-hardware": "",
    "ma-firmware": "",
    "ma-version": "",
    "ma-interfaces": [
      {
        "ma-interface-name": "",
        "ma-interface-type": ""
      }
    ],
    "ma-last-measurement": "",
    "ma-last-report": "",
    "ma-last-instruction": "",
    "ma-last-configuration": "",
    "ma-supported-tasks": [
      {
        "ma-task-name": "",
        "ma-task-registry": ""
      },
      {
        "ma-task-name": "",
        "ma-task-registry": ""
      },
      {
        "ma-task-name": "",
        "ma-task-registry": ""
      },
      {
        "ma-task-name": "",
        "ma-task-registry": ""
      },
      {
        "ma-task-name": "",
        "ma-task-registry": ""
      }
    ]
  }
}
```

← Ma capabilities information

Response of get failure information

```
⊞ {  
  "failure code 1": "no spare CPU cycles",  
  "failure code 2": "out of spare memory",  
  "failure code 3": "collector is not responding"  
}
```

Response of get logging information

```
⊞ {  
  "ma-log-agent-id": "",  
  "ma-log-event-time": "",  
  "ma-log-code": "",  
  "ma-log-description": ""  
}
```

- **Report Protocol**

- POST /collector/report/

- JSON format parameters

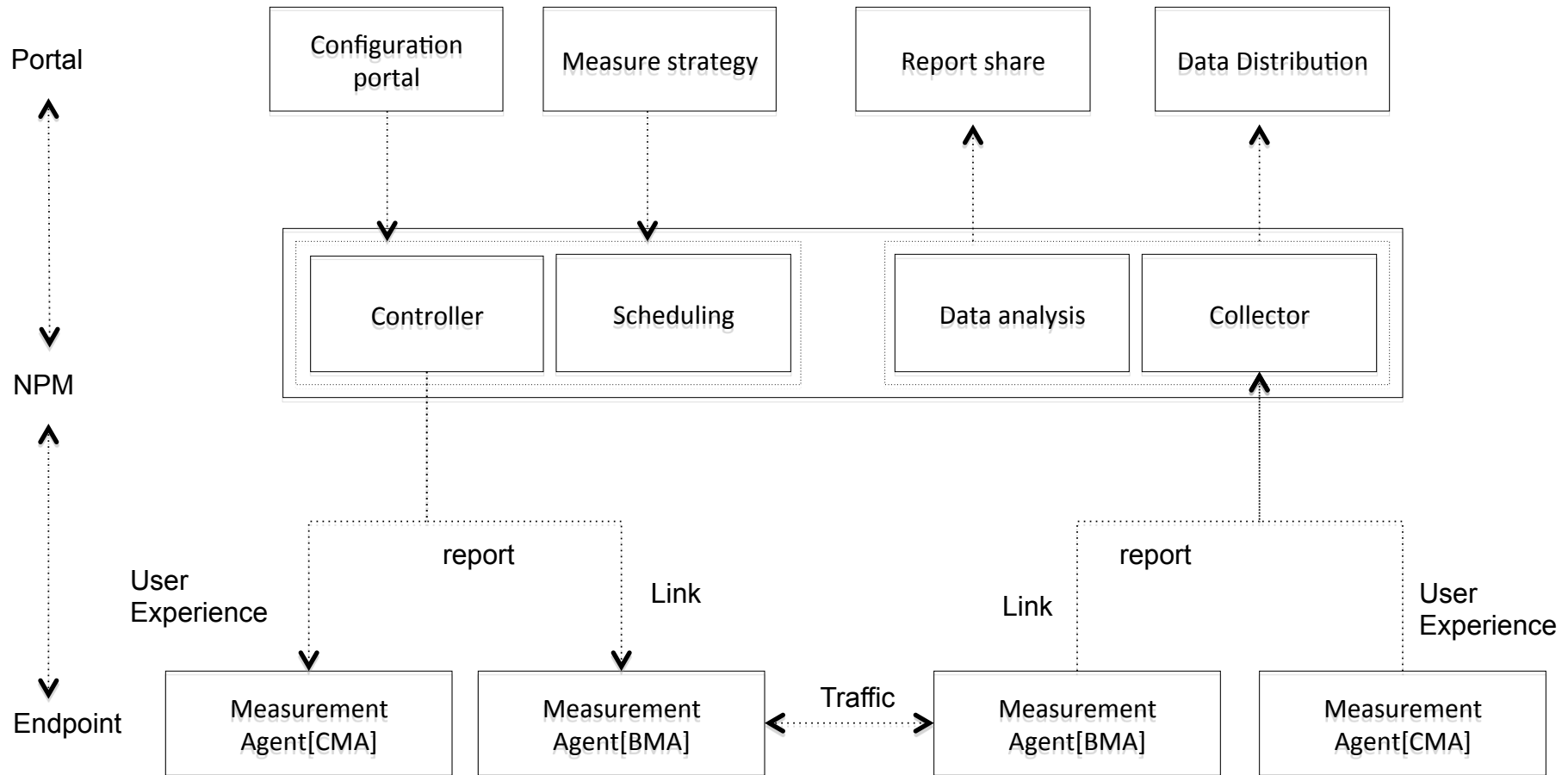
- Align with LMAP information model

```
{
  "ma-report-date": "",
  "ma-report-agent-id": "",
  "ma-report-group-id": "",
  "ma-report-tasks": [
    {
      "ma-report-task-config": {
        "ma-task-name": "",
        "ma-task-registry": "",
        "ma-task-options": [
          {
            "name": "",
            "value": ""
          },
          {
            "name": "",
            "value": ""
          }
        ]
      }
    }
  ],
  "ma-task-suppress-by-default": "",
  "ma-task-cycle-id": "",
  "ma-report-task-column-labels": [
  ],
  "ma-report-task-rows": [
    {
      "ma-report-result-time": "",
      "ma-report-conflicting-tasks": "",
      "ma-report-result-cross-traffic": "",
      "ma-report-result-values": ""
    }
  ]
}
```



Report information

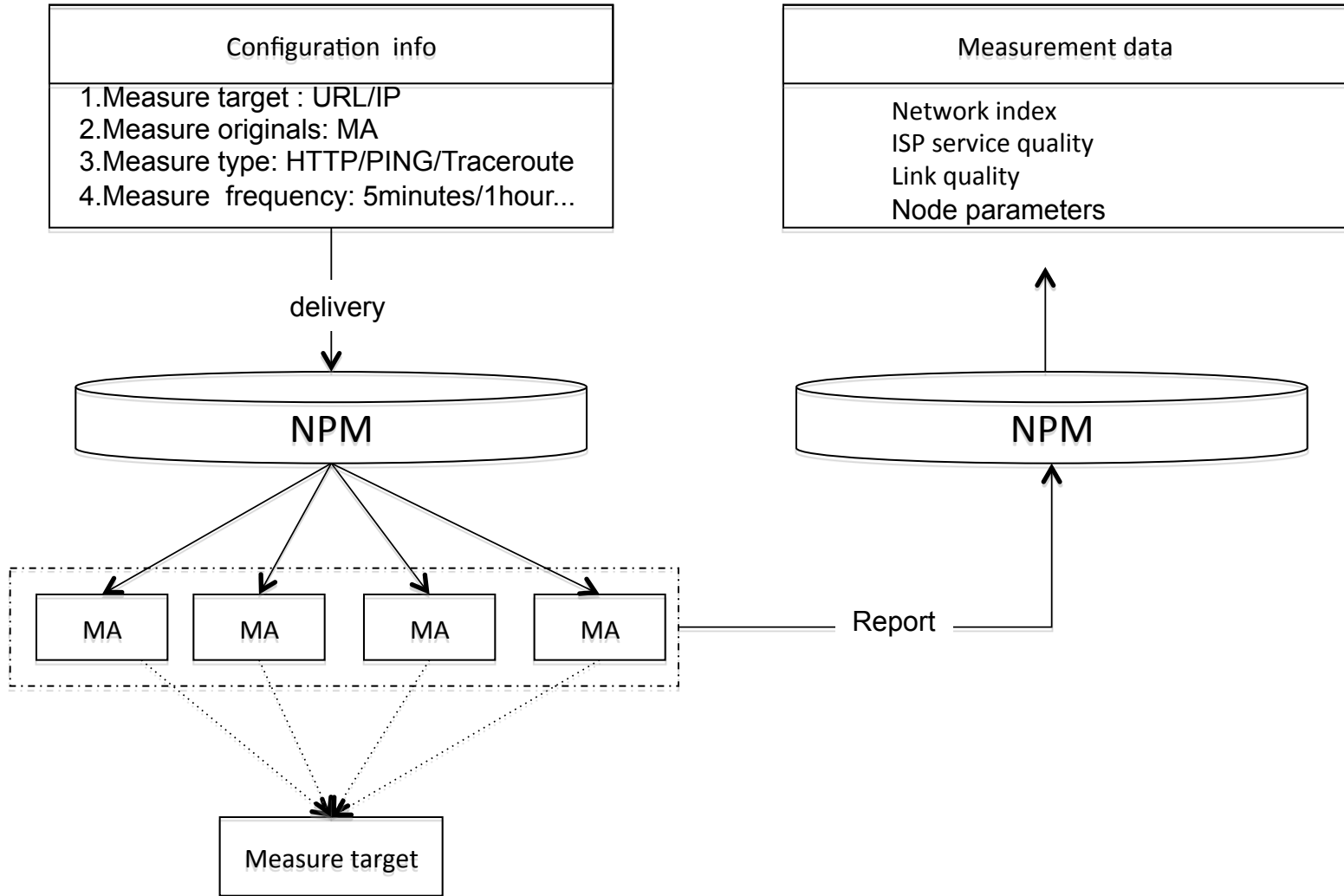
Running code & Deployment Case



Architecture

NPM - Network Performance Monitor
BMA - Backbone Measurement Agent
CMA - Client Measurement Agent

Data flow



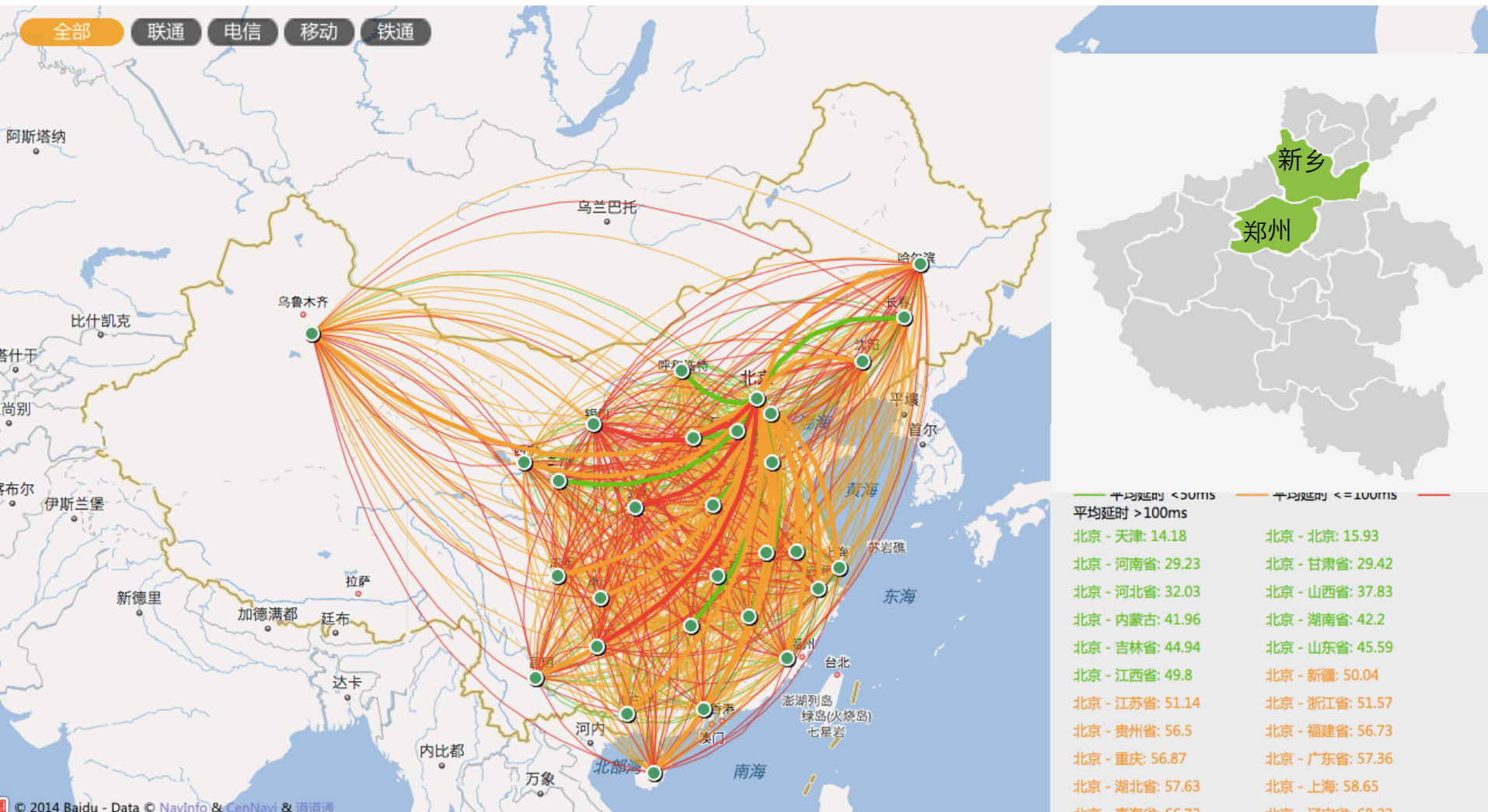
Measurement Agent Deployment

- Measurement agents deployment
 - IDCs
 - User access location
 - Carrier operators



Some Real Data...

- Link quality of network node



Measurement Detail

- Measurement Technology
 - Ping Measurement
 - Packet loss rate
 - Latency
 - HTTP Measurement
 - Download speed
 - First packet arrival time
 - DNS analysis time
 - Response time
 - The first screen time

Thanks!