

REST Style Large Measurement Platform Protocol

draft-liu-lmap-rest-01.txt

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Outline

- **REST Style LMAP Protocol (Update from 00 version)**
 - Control Protocol
 - Configuration Update
 - Instruction Assignment
 - Capacity and Status
 - Report Protocol
- **Running Code & Demo**

Background

- **draft-liu-lmap-rest-00 was presented in IETF#90**
 - defines a REST style LMAP protocol, based on information model draft 00 version
 - We update the draft to align with information model 02 version.
- **Motivation to use REST**
 - 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

```
// Configuration
{
  "ma-config": {
    "ma-agent-id": "550e8400-e29b-41d4-a716-446655440000",
    "ma-control-tasks": [
      {
        "ma-task-name": "Controller configuration",
        "ma-task-registry-entry": "urn:ietf:lmmap:control:http_controller_configuration"
      },
      {
        "ma-task-name": "Controller status and capabilities",
        "ma-task-registry-entry": "urn:ietf:lmmap:control:http_controller_status_and_capabilities"
      },
      {
        "ma-task-name": "Controller instruction",
        "ma-task-registry-entry": "urn:ietf:lmmap:control:http_controller_instruction"
      }
    ]
  }
  "ma-control-channels": [
    {
      "ma-channel-name": "Controller instruction",
      "ma-channel-target": "http://www.example.com/lmap/controller",
      "ma-channel-credentials": { } // structure of certificate omitted for brevity
    }
  ]
  "ma-control-schedules": [
    {
      "ma-schedule-name": "Controller schedule",
      "ma-schedule-tasks": [
        {
          "ma-schedule-task-name": "Controller configuration",
          "ma-schedule-channels": [
            {
              "ma-schedule-channel-interface-selection": [1],
              "ma-schedule-task-source-channel-names": ["Controller channel"]
            }
          ]
        }
      ]
    },
    {
      "ma-schedule-task-name": "Controller status and capabilities",
      "ma-schedule-channels": [
        {

```

```
        "ma-schedule-channel-interface-selection": [1],
        "ma-schedule-task-source-channel-names": ["Controller channel"]
    }
]
},
{
    "ma-schedule-task-name": "Controller instruction",
    "ma-schedule-channels": [
        {
            "ma-schedule-channel-interface-selection": [1],
            "ma-schedule-task-source-channel-names": ["Controller channel"]
        }
    ]
}
]
}
}
]
"ma-schedule-timing": {
    "ma-timing-name": "hourly randomly",
    "ma-timing-calendar": {
        "ma-calendar-minutes": ["00"],
        "ma-calendar-seconds": ["00"]
    }
    "ma-timing-random-spread": "3600000"
}
}
]
"ma-credentials": { } // structure of certificate omitted for brevity
}
}
```

- **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-instruction": {
    "ma-instruction-tasks": [
      {
        "ma-task-name": "UDP Latency",
        "ma-task-registry-entry": "urn:ietf:ippm:measurement:UDPLatency-Poisson-XthPercentileMean",
        "ma-task-options": [
          {"name": "X", "value": "99"},
          {"name": "rate", "value": "5"},
          {"name": "duration", "value": "30.000"},
          {"name": "interface", "value": "broadband"},
          {"name": "destination-ip", "value": {"version": "ipv4", "ip-address": "192.168.2.54"}},
          {"name": "destination-port", "value": "50000"},
          {"name": "source-port", "value": "50000"}
        ],
        "ma-task-suppress-by-default": "TRUE"
      },
      {
        "ma-task-name": "Report",
        "ma-task-registry-entry": "urn:ietf:lmep:report:http_report",
        "ma-task-options": [
          {"name": "report-with-no-data", "value": "FALSE"}
        ],
        "ma-task-suppress-by-default": "FALSE"
      }
    ]
  },
  "ma-report-channels": [
    {
      "ma-channel-name": "Collector A",
      "ma-channel-target": "http://www.example2.com/lmap/collector",
      "ma-channel-credentials": { } // structure of certificate omitted for brevity
    }
  ],
  "ma-instruction-schedules": [
    {
      "ma-schedule-name": "4 times daily test UDP latency and report",
      "ma-schedule-tasks": {
        {
          "ma-schedule-task-name": "UDP Latency",
          "ma-schedule-downstream-tasks": [
            {
              "ma-schedule-task-output-selection": [1],

```

```
        "ma-schedule-task-downstream-task-configuration-names": "Report"
    }
  ]
},
{
  "ma-schedule-task-name": "Report",
  "ma-schedule-channels": [
    {
      "ma-schedule-channel-interface-selection": [1],
      "ma-schedule-channel-names": "Collector A"
    }
  ]
}
}
"ma-schedule-timing": {
  "ma-timing-name": "once every 6 hours",
  "ma-timing-calendar": {
    "ma-calendar-hours": ["00", "06", "12", "18"],
    "ma-calendar-minutes": ["00"],
    "ma-calendar-seconds": ["00"]
  }
  "ma-timing-random-spread": "21600000"
}
}
}
}
```

- **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

```
{
  ma-status-and-capabilities {
    "ma-agent-id": "550e8400-e29b-41d4-a716-446655440000",
    "ma-device-id": "urn:dev:mac:0024beffffe804ff1"
    "ma-hardware": "mfr-home-gateway-v10"
    "ma-firmware": "25637748-rev2a"
    "ma-version": "ispa-v1.01"
    "ma-interfaces": [
      {
        "ma-interface-name": "broadband",
        "ma-interface-type": "PPPoE"
      }
    ]
    "ma-last-measurement": "",
    "ma-last-report": "",
    "ma-last-instruction": "",
    "ma-last-configuration": "2014-06-08T22:47:31+00:00",
    "ma-supported-tasks": [
      {
        "ma-task-name": "Controller configuration",
        "ma-task-registry": "urn:ietf:lmep:control:http_controller_configuration"
      },
      {
        "ma-task-name": "Controller status and capabilities",
        "ma-task-registry": "urn:ietf:lmep:control:http_controller_status_and_capabilities"
      },
      {
        "ma-task-name": "Controller instruction",
        "ma-task-registry": "urn:ietf:lmep:control:http_controller_instruction"
      },
      {
        "ma-task-name": "Report",
        "ma-task-registry": "urn:ietf:lmep:report:http_report"
      },
      {
        "ma-task-name": "UDP Latency",
        "ma-task-registry": "urn:ietf:ippm:measurement:UDPLatency-Poisson-XthPercentileMean"
      }
    ]
  }
}
```

- **Report Protocol**

- POST /collector/report/

- JSON format parameters

- Align with LMAP information model

```
{
  ma-report: {
    "ma-report-date": "2014-06-09T02:30:45+00:00",
    "ma-report-agent-id": "550e8400-e29b-41d4-a716-446655440000",
    "ma-report-tasks": [
      "ma-report-task-config": {
        "ma-task-name": "UDP Latency",
        "ma-task-registry-entry": "urn:ietf:ippm:measurement:UDPLatency-Poisson-XthPercentileMean",
        "ma-task-options": [
          {"name": "X", "value": "99"},
          {"name": "rate", "value": "5"},
          {"name": "duration", "value": "30.000"},
          {"name": "interface", "value": "broadband"},
          {"name": "destination-ip", "value": {"version": "ipv4", "ip-address": "192.168.2.54"}},
          {"name": "destination-port", "value": "50000"},
          {"name": "source-port", "value": "50000"}
        ]
      },
      "ma-report-task-column-labels": ["start-time", "conflicting-tasks", "cross-traffic", "mean", "min", "max"],
      "ma-report-task-rows": [{"2014-06-09T02:30:10+00:00", "", "0", "20.13", "18.3", "24.1"}]
    ]
  }
}
```

Next Step

- Address the remaining issues

Running code & Demo

- **Report Protocol**

- Implemented using Python

- Masasserver.py:

- MA: 8080

- Controller/collector: 8088

- Ins_post.py: command console

- ping.py: test task

- Paravalues.py: JSON parameters

Thanks!