Large MeAsurement Platform Protocol based on HTTP

draft-bagnulo-lmap-http-01
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LMAP WG – IETF88
Big Picture

Controller

Control Protocol
Instructions
Status/Capabilities
Logging
HTTP

Collector

Report protocol
HTTP

MA

HTTP used as a Transport
Data Model expressed in JSON
Simple example

• Simple scenario with these elements:
  – a Controller with FQDN controller.example.org,
  – a Collector with FQDN collector.example.org, and
  – a MA with UUID f47ac10b-58cc-4372-a567-0e02b2c3d479

• Test to be performed:
  – A UDP latency test, without cross-traffic, that reports the 99th percentile mean of a burst of packets sent following a Poisson distribution that lasts for 30 seconds and with rate 5 packets per second. The destination address is 192.0.2.1 and the destination and source port are 50000. We want to repeat this test for 7 days every hour. Report the results every hour.
Channel

- Defines a communication channel between the MA and other element of LMAP framework
  - with the Collector to report results back,
  - with the Controller to retrieve Instructions or report status/capabilities and logging information
    - Target: URL
    - Certificate: X.509 Certificate
    - Communication Timing: Timing
MA pre-configuration and configuration

• Before MA deployment
  – Channel with the Controller
  – MA ID (depends on the scenario)

• After deployment
  – Retrieves set of channels for
    • Instructions
    • Status/capabilities
    • Logging
    • Report
Pre-configuration in the example

• Target:  

• Timing: Inmediate
GET versus POST

• We are using POST to avoid overloading the URLs with MA and other information
Control Protocol: Retrieving Channels

POST .well-known/lmap/ma-info/ HTTP/1.1
Host: controller.example.com

{"ma-id" : "f47ac10b-58cc-4372-a567-0e02b2c3d479",}

"measurement-set": "http://controller.example.org/measurements/",
"report-channel-set": "http://controller.example.org/channels/",
"repeated-schedule-set": "http://controller.example.org/schedules/"
"status-set": "http://controller.example.org/status/"
"logging-set": "http://controller.example.org/logging/"
Control Protocol: Status information

POST /well-known/lmap/status/ HTTP/1.1
Host: controller.example.com

{"ma-id": "f47ac10b-58cc-4372a567-0e02b2c3d479",
 "ma-interfaces": [
 {
 "if-name": eth0
 ,
 "if-type": ethernetCsmacd
 ,
 "ip-address": {
 ,
 "protocol": v4
 ,
 "address": 10.1.1.1
 }
 ]
 ,
 "supported-measurements": [
 {
 "metric": UDP_Latency
 }
 ]
}
Control Protocol: Retrieving Instructions

POST /.well-known/lmap/measurement
{"ma-id": "f47ac10b-58cc-4372a567-0e02b2c3d479"},
"tests": [{"name": "latency",
  "metric": "UDP_Latency",
  "options": [{"environment": "No-cross-traffic",
    "Output-type": "Xth-percentile-mean",
    "X": "99",
    "Scheduling": "Poisson",
    "rate": "5",
    "duration": "30.000",
    "destination-ip": {"version": "4", "value": "192.0.2.1"},
    "destination-port": "50000",
    "source-port": "50000"
  }
  ]
}
Control Protocol: Retrieving Instructions

POST /.well-known/lmap/channels/
{"ma-id": "f47ac10b-58cc-4372a567-0e02b2c3d479"},

"name": "internal channels",
"version": "1.0",
"description": "hourly report to main database collector",
"reports": {
  "name": "hourly report",
  "description": "hourly report to main database",
  "collector": "http://collector.example.org/results/
              f47ac10b-58cc-4372-a567-0e02b2c3d479",
  "timing": {
    "timing_type": "calendar",
    "timing-config": {
      "minutes": ["22"],
      "seconds": ["40"]
    }
  }
}
Control Protocol: Retrieving Instructions

POST /well-known/lmap/schedules/
{"ma-id": "f47ac10b-58cc-4372a567-0e02b2c3d479"},

"name": "hourly measurements",
"version": "1.0",
"schedules": [{
  "name": "Hourly",
  "tests": ["latency"],
  "reports": ["hourly report"],
  "timing": {
    "timing_type": "calendar",
    "timing-config": {
      "minutes": ["05"],
      "seconds": ["30"]
    }}]
Next..

• The MA performs the test
  – Sends the UDP packets
  – Receives replies
  – Calculates the 99% mean

• It is now ready to report the results back to the collector
POST  //collector.example.org/results/f47ac10b-58cc-4372-a567-0e02b2c3d479

"name": "hourly measurements",
{
  "report-date": "utc-milliseconds",
  "reporting-agent": "f47ac10b-58cc-4372-a567-0e02b2c3d479",
  "results": {
    "test-name": "latency",
    "test-agent": "f47ac10b-58cc-4372-a567-0e02b2c3d479",
    "test-parameters": {
      "name": "latency",
      "description": "UDP round trip latency",
      "metric": "UDP_Latency",
      "options": [
        {
          "environment": "No-cross-traffic",
          "Output-type": "Xth-percentile-mean",
          "X": "99",
          "Scheduling": "Poisson",
          "rate": "5",
          "duration": "30.000",
          "destination-ip": {
            "version": "4",
            "value": "192.0.2.1"
          },
          "source-IP-address": {
            "version": "4",
            "value": "198.151.100.34"
          },
          "destination-port": "50000",
          "source-port": "50000",
          "start-time": "utc-milliseconds",
          "end-time": "utc-milliseconds"
        }
      ]
    }
  }
}