XION Prototype

progress report
4/15/2014

Agenda

- Current progress
- Deploy an XION network
  - Phase 1: path beacon propagation
  - Phase 2: path construction
- Scheduled workload

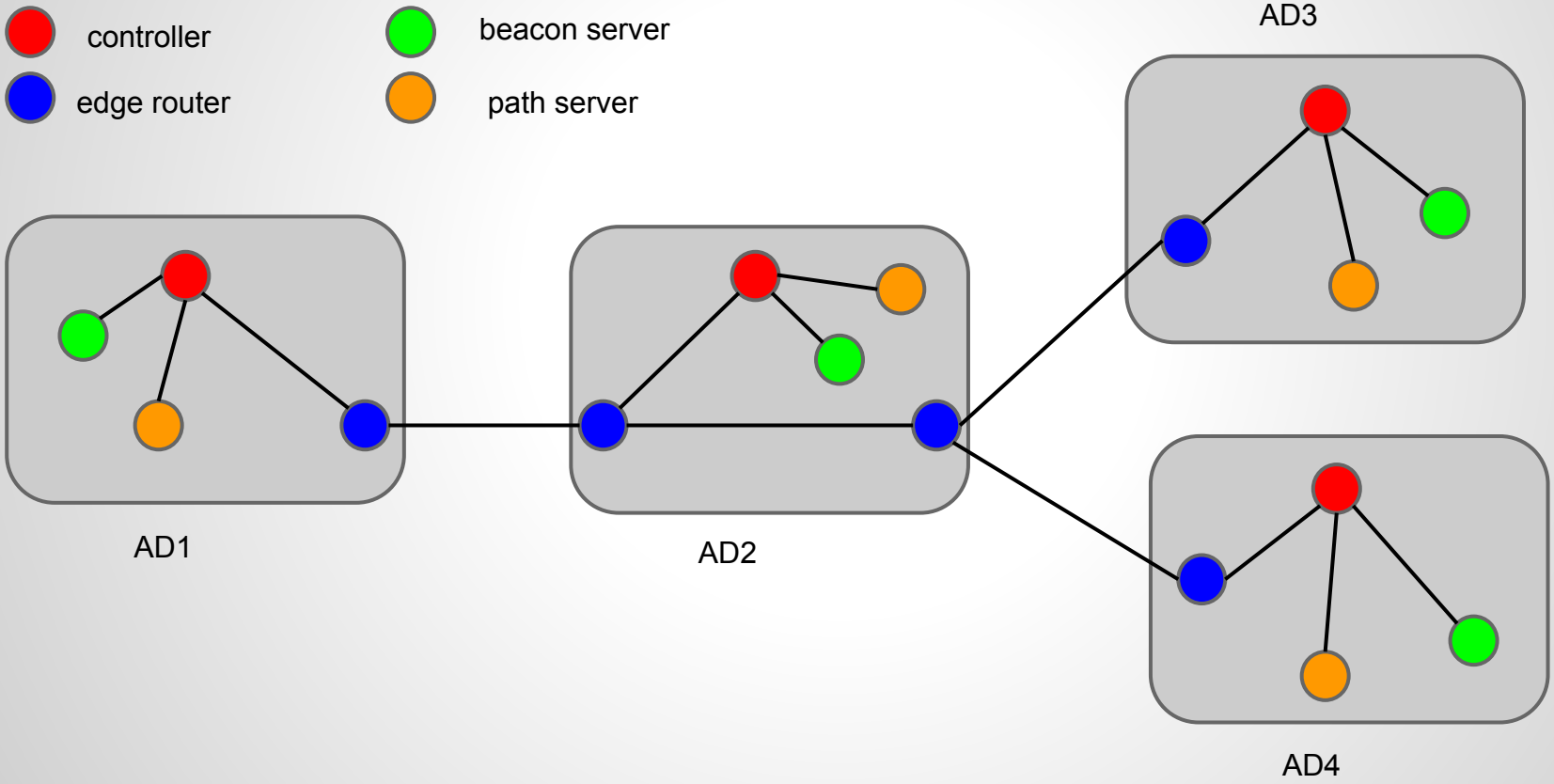
Progress update

- beacon service:
  - generation at core AD: done
  - propagation (including verification) at inter/stub ADs: done
- path service:
  - up-path parsing at inter/stub ADs: done
  - up-path buffering at inter/stub ADs: done
  - down-path registration at core AD: in-progress (expected this week)
  - down-path request/response for inter/stub ADs: (expected end of April)

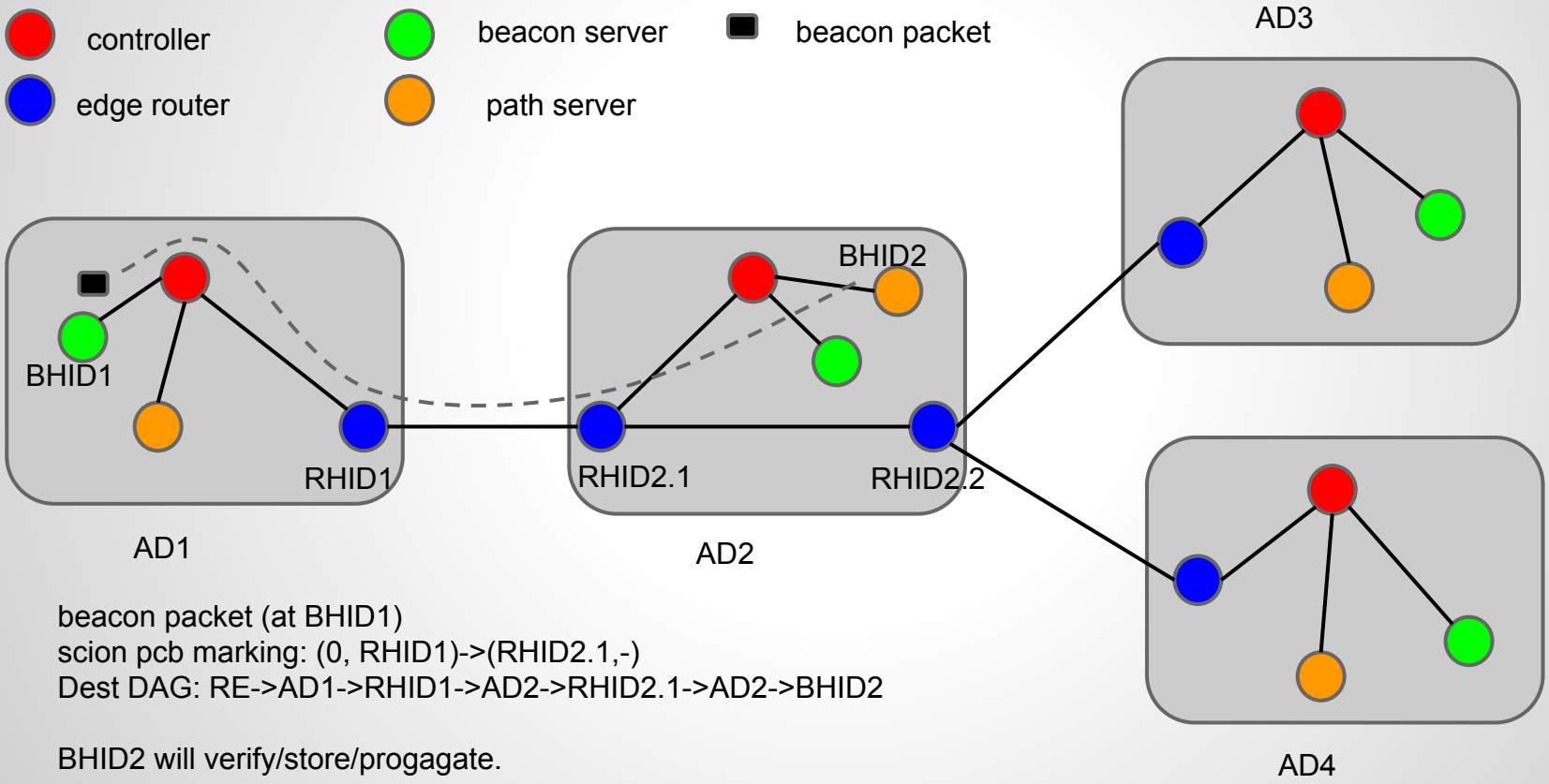
How to deploy an XION network

- Deploy an arbitrary topology through modifying configuration files in xia/etc/click
- xia_address.click: define AD/HID identifiers for all service instances (controller, routers, beacon, path, certification)
- xia_scion_topology: define logical connections between instances defined in xia_address.clck
- Currently we use same HIDs for same services in each AD
  - beacon HID: 0...100000
  - path HID: 0...200000
  - cert HID: 0...300000

Example topology



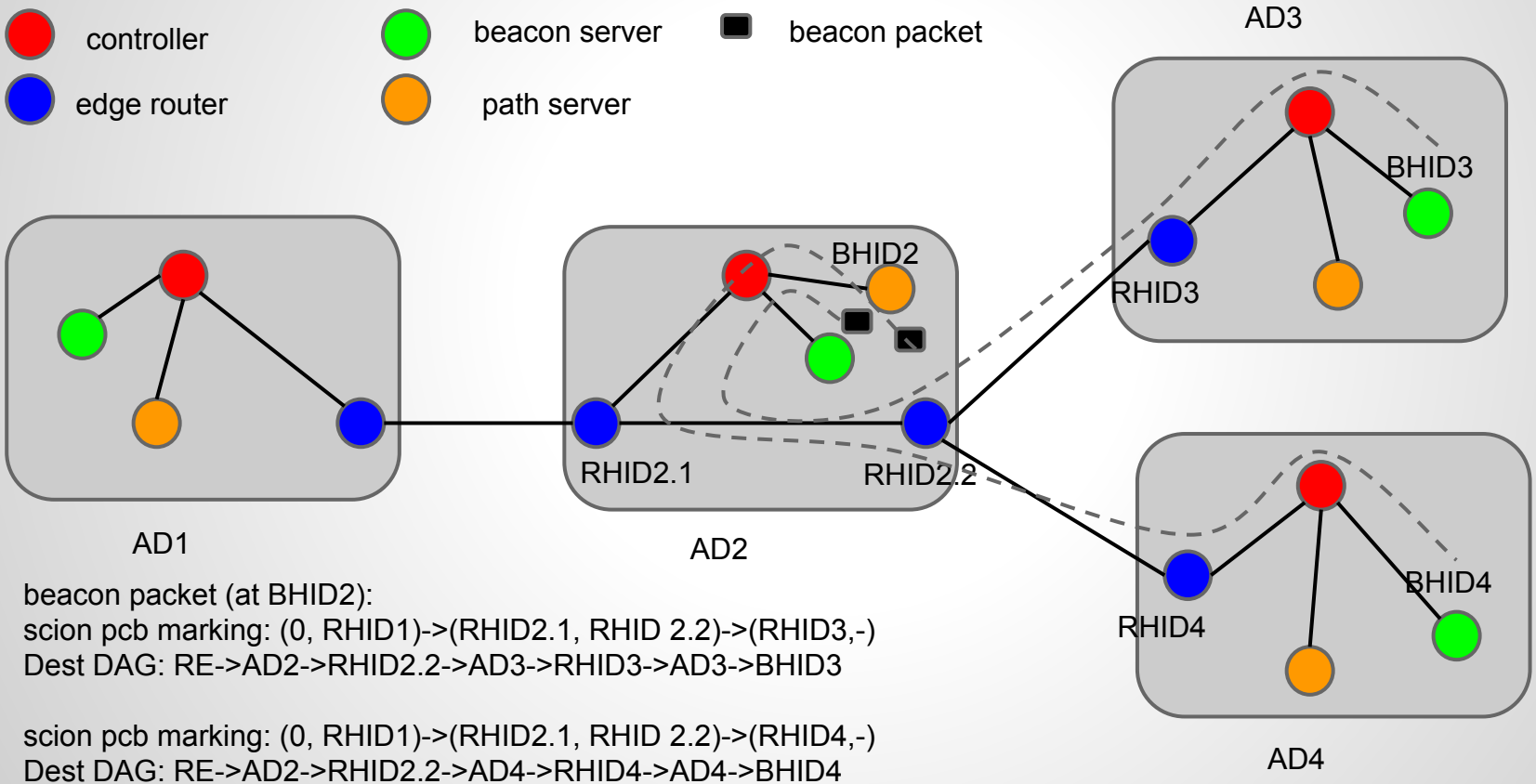
Phase 1: beacon propagation



beacon packet (at BHID1)
scion pcb marking: (0, RHID1)->(RHID2.1,-)
Dest DAG: RE->AD1->RHID1->AD2->RHID2.1->AD2->BHID2

BHID2 will verify/store/progagate.

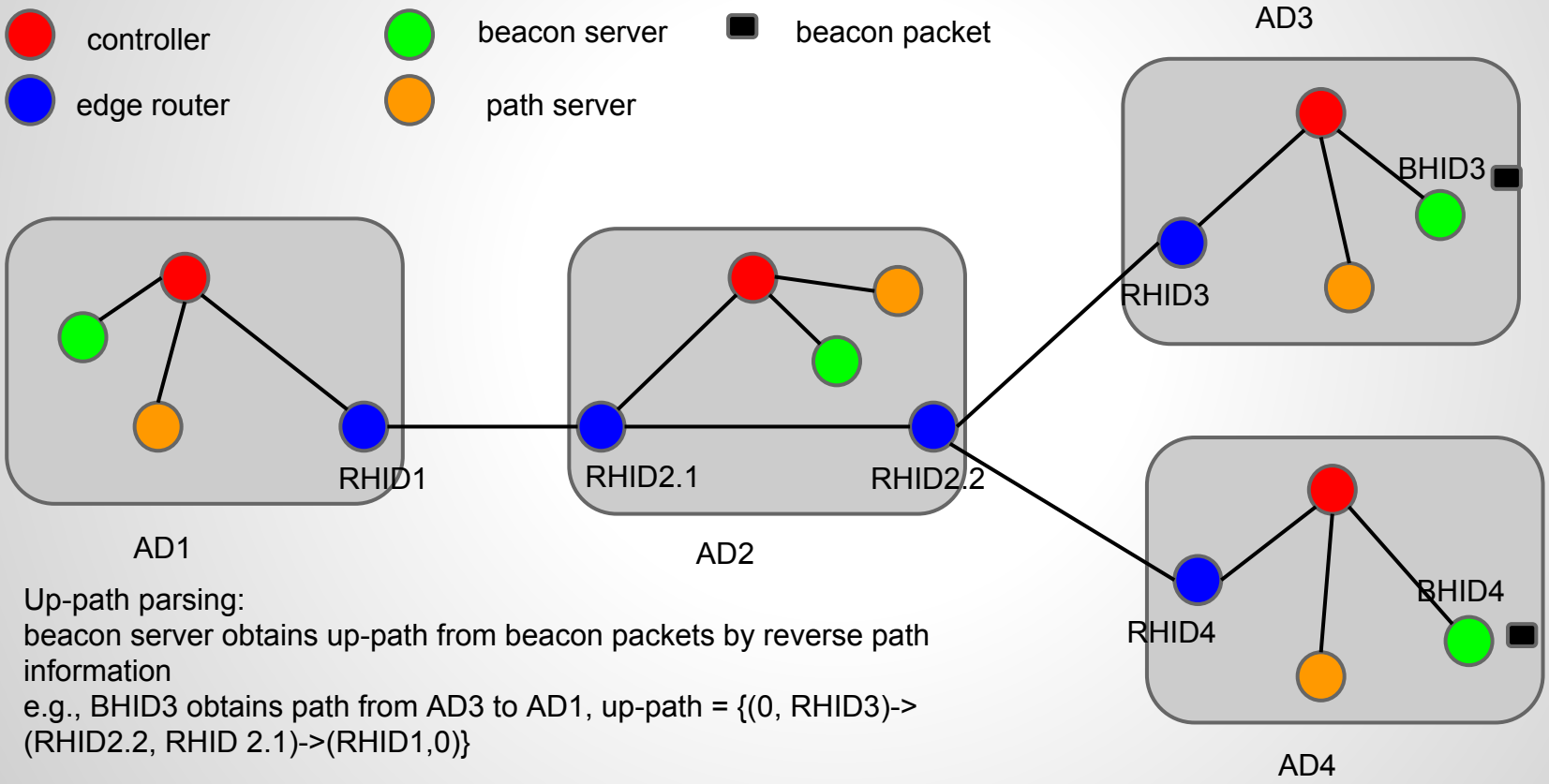
Phase 1: beacon propagation



beacon packet (at BHID2):
scion pcb marking: (0, RHID1)->(RHID2.1, RHID 2.2)->(RHID3,-)
Dest DAG: RE->AD2->RHID2.2->AD3->RHID3->AD3->BHID3

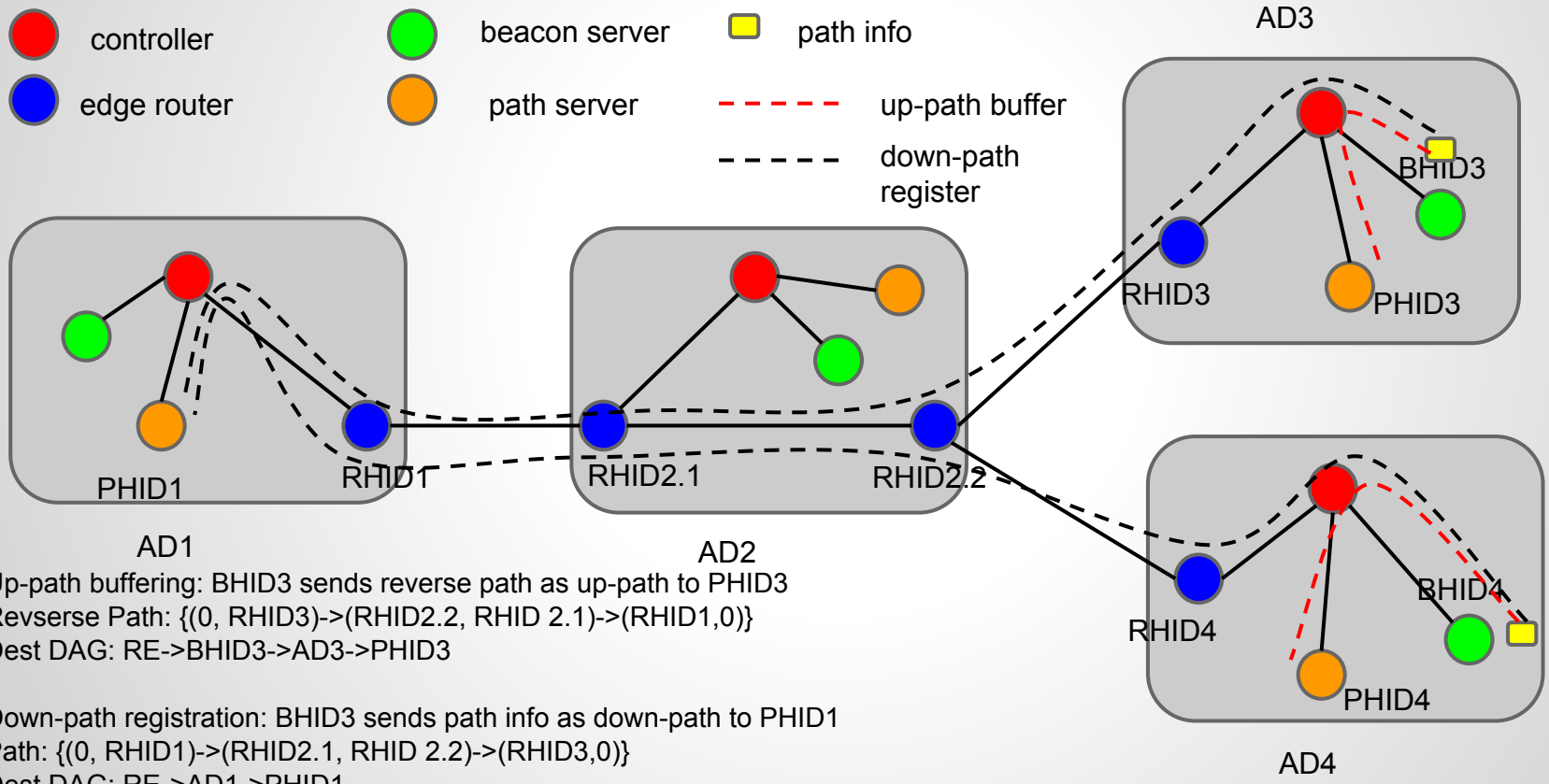
scion pcb marking: (0, RHID1)->(RHID2.1, RHID 2.2)->(RHID4,-)
Dest DAG: RE->AD2->RHID2.2->AD4->RHID4->AD4->BHID4

Phase 2: path construction



Up-path parsing:
beacon server obtains up-path from beacon packets by reverse path information
e.g., BHID3 obtains path from AD3 to AD1, up-path = {(0, RHID3)-> (RHID2.2, RHID 2.1)->(RHID1,0)}

Phase 2: path construction



Up-path buffering: BHID3 sends reverse path as up-path to PHID3
Revserse Path: {(0, RHID3)->(RHID2.2, RHID 2.1)->(RHID1,0)}
Dest DAG: RE->BHID3->AD3->PHID3

Down-path registration: BHID3 sends path info as down-path to PHID1
Path: {(0, RHID1)->(RHID2.1, RHID 2.2)->(RHID3,0)}
Dest DAG: RE->AD1->PHID1

Scheduled Workload

- Phase 3: Data plane with XION path (expect 3 weeks)
  - Simulate few endhosts located in stub ADs
    - Down-path request/response for destination ADs (path server)
    - End-to-end path resolution (path server)
    - End-to-end data communication between peer endhosts
  - In end of May, we should have a running prototype
- What we don’t have now:
  - Use SID routing instead of XID routing
  - Debugging tool: Automatic testing through logs generated from XION
  - Certification service (not urgent). Certification service provides credential retrieving when we update credentials, e.g., certificates, root of trust file.