Infrastructure-to-application Information Exposure

I2AEX BoF

IETF 83

Monday, March 26, 2012 – Paris

I2AEX

Why?
- To set distributed applications free to get smarter

How?
- Enabling infrastructures to expose useful information

What?
- Extensions / Usage modes for existing protocols

But <u>Why</u>?

- You (!) keep asking that
  - In ALTO
    - CDN usage for ALTO, ALTO for high capacity networks, s2c notifications…
  - Software Driven Networking initiatives
    - BoF @ IETF-82, <u>sdnp@ietf.org</u>
  - Datacenter initiatives
    - <u>dc@ietf.org</u>, <u>dcrg-interest@irtf.org</u>, bar BoFs…
- Maybe we can **help (<u>some</u>) apps get smarter**
  - <u>Focus restriction</u>: fully and partially controlled env
   - CDN, datacenter apps

And <u>How</u>?

- Identifying what kind of **i2a** information would be useful
  - Focus restriction reminder: in fully-to-partially controlled environments

- Identifying the **smallest possible tool** useful to the **widest possible audience**
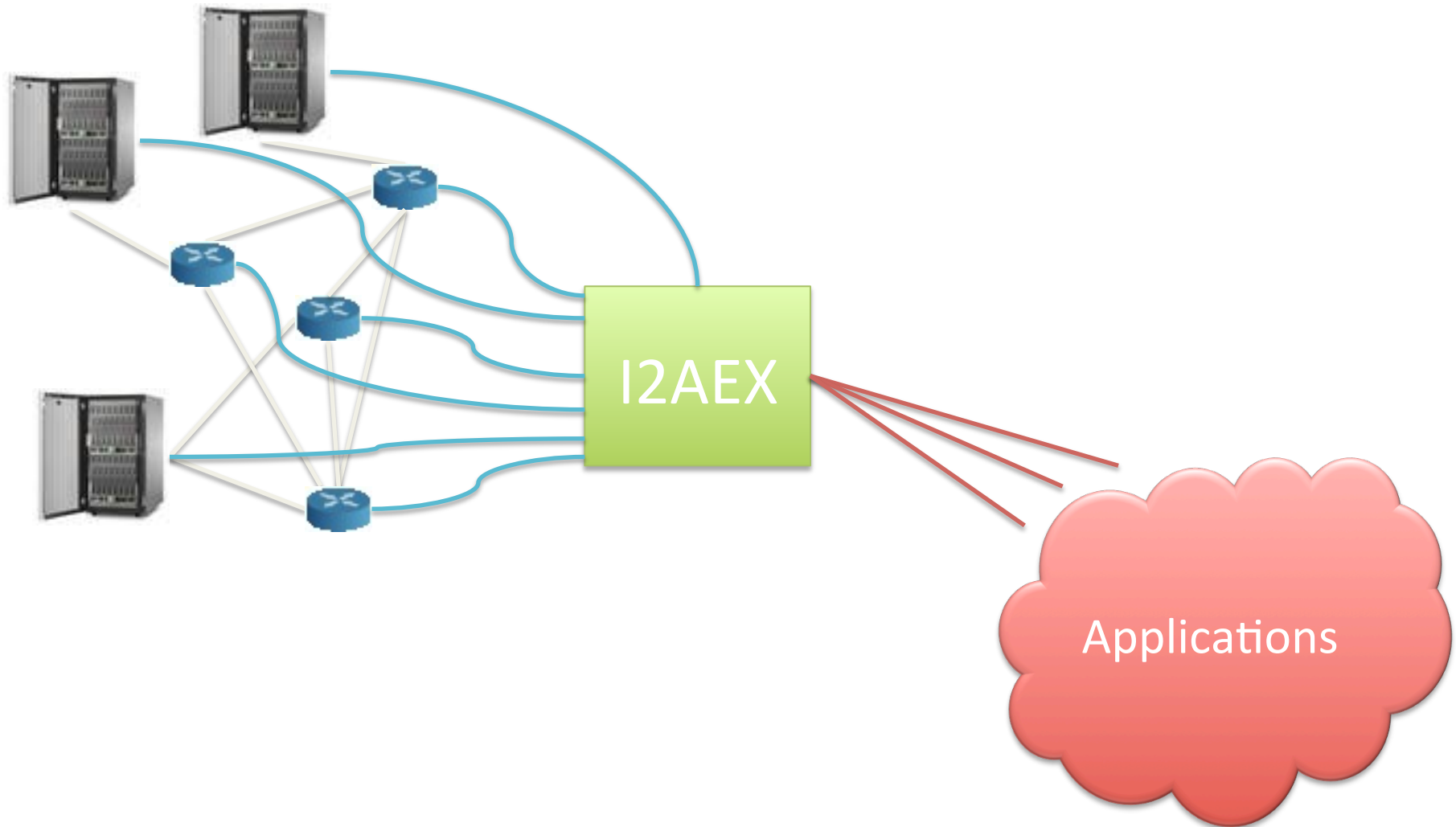 - (If any)

So <u>What</u>?

- Possible extensions / usage modes for existing protocols
  - Easily accessible from app layer
    - Reminder: focus on fully/partially controlled apps, **CDN** and **datacenters** to begin with
  - Info types:
    - Network load (on "reasonable" timescales)
    - Resource availability (CPU, storage)
    - Content availability
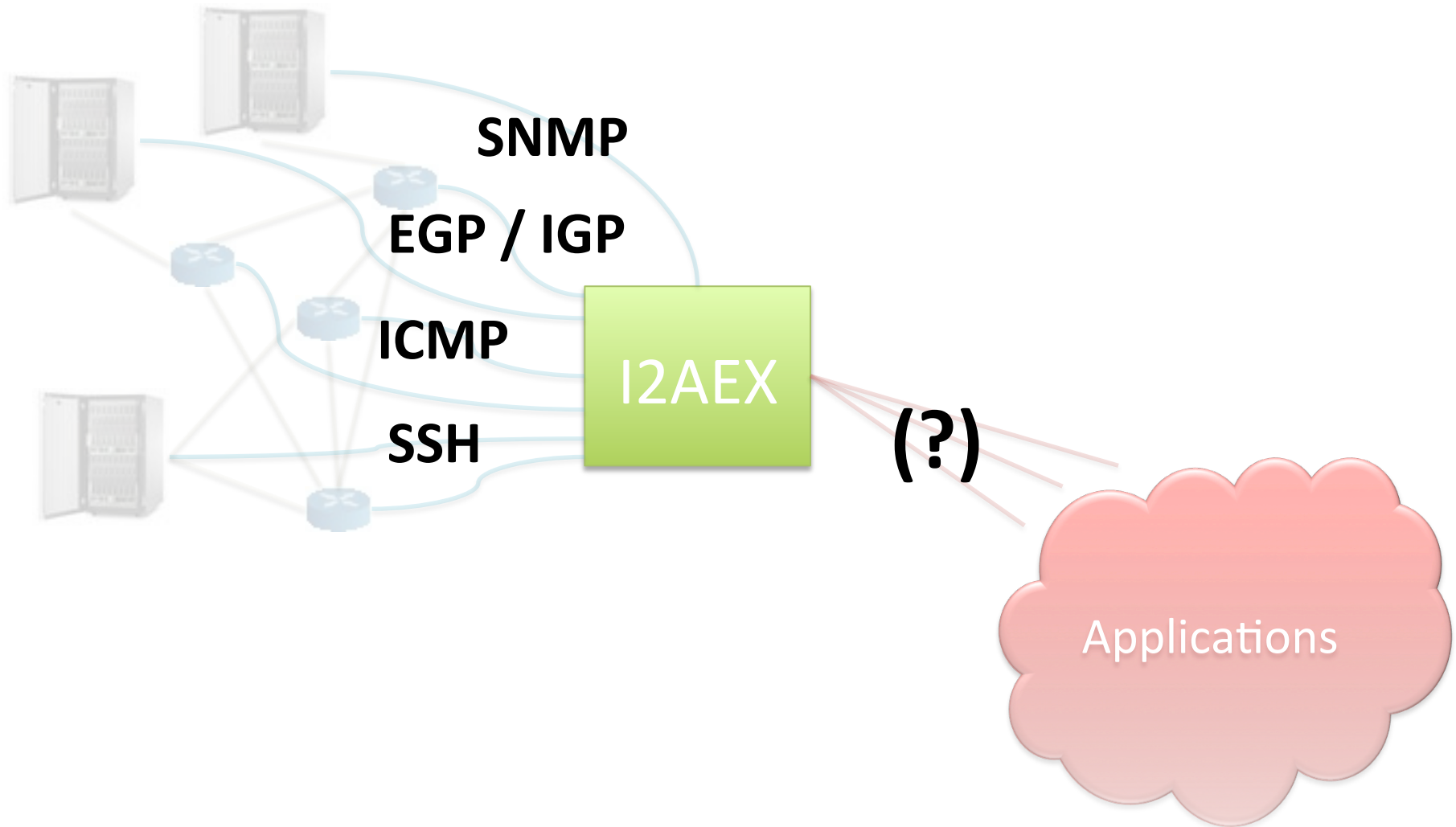   - …

Goal (?)

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Applications

Goal

SNMP

EGP / IGP

ICMP

SSH

I2AEX

(?)
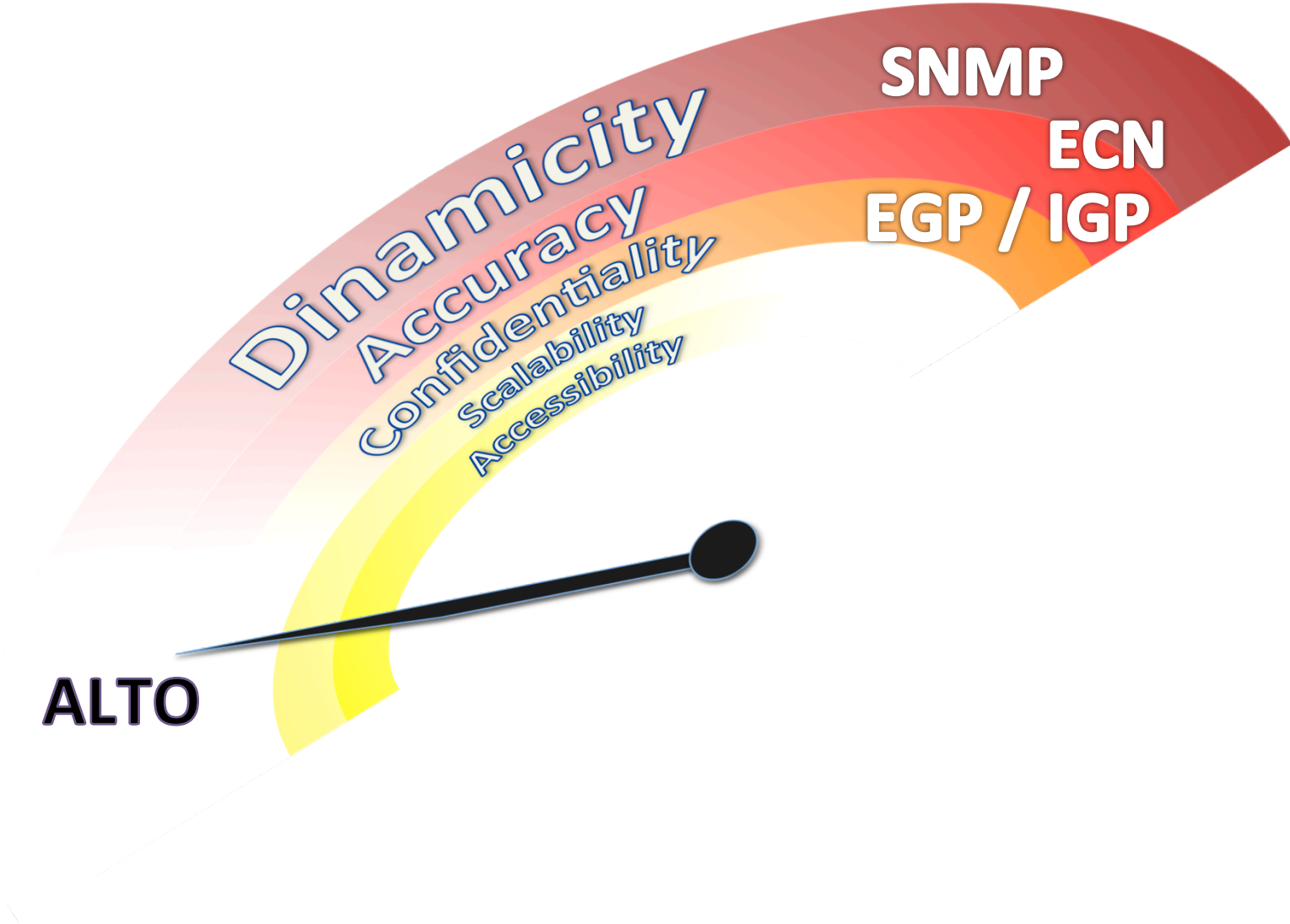
Applications

First Question

Is there a need for (yet!) another infrastructure-to-application communications mechanism?

– [Focus restrictions reminder goes here]

Doing it the ALTO way

The ALTO Protocol is…

- Network-to-application Information Exposure
  - <u>Very</u> "application friendly" (HTTP+REST+JSON)
  - Intended to let network operators (and whoever else wants to) provide information about the more and less appropriate network destinations
    - E.g. "you may not want to get your file from there, you fool, that's Australia!"
- Easily extensible
- Done (OK, almost…)

The ALTO Protocol is also…

- Primarily intended for uncontrolled apps
  - Untrusted parties / Low confidentiality
- Primarily designed for quasi-static info
  - Based on network and cost maps

ALTO i2aex Extensions

- New information types
  - Network load
  - Resource availability
  - ...
- Server-to-client notifications
- Incremental updates

Incremental updates

- draft-pbryan-json-patch (APPSAWG item)

ALTO Information

```
{
  "resources": [
    {
      "capabilities": {
        "cost-modes": [
          "numerical"
        ],
        "cost-types": [
          "routingcost"
        ]
      },
      "media-types": [
        "application/alto-costmap+json"
      ],
      "uri": "http://alto.ietf.org/costmap/num/routingcost"
    },
...
```
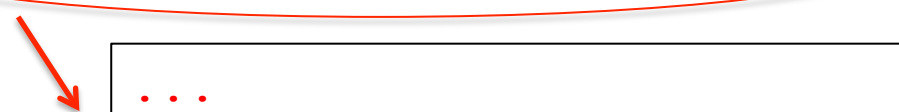
```
{
  "meta" : {},
  "data" : {
    "cost-mode" : "numerical",
    "cost-type" : "routingcost",
    "map-vtag"  : "1266506139",
    "map" : {
      "mypid1": { "mypid1" : "0",
                  "peerpid2" : "10",
                  "pid3" : "20"},
...
```

New Information Types

```
...
    "media-types": [
      "application/alto-costmap+json",
    ],
    "uri": "http://alto.ietf.org/costmap/num/routingcost"
  },
  {

    "media-types" : [
      "application/alto-serverload+json"
    ],
    "uri" :  "http://alto.tilab.com/serverload"
  },
...
```

```
...
      "server1": {
              "lastmin" : "0.7",
              "last5min" : "0.3",
              "last15min" : "0.2"
              },
...
```

Server-to-client Notifications

- HTTP polling?

- Websockets?

- ALTO-over-XYZP?

```
"media-types": [
        "application/alto-costmap+json"
    ],
    "uri": [
      "http://alto.ietf.org/costmap/num/routingcost",
      "xyzp://alto.ietf.org/costmap/num/routingcost"
    ],
...
```

Second Question

IFF answer to First Question is yes, then

does the ALTO protocol provide a reasonable basis for an i2a information exposure mechanism? (Focus restrictions apply.)