CATS Metrics Exposure Using ALTO

draft-ymg-opsawg-service-deployment-with-alto-cats-00

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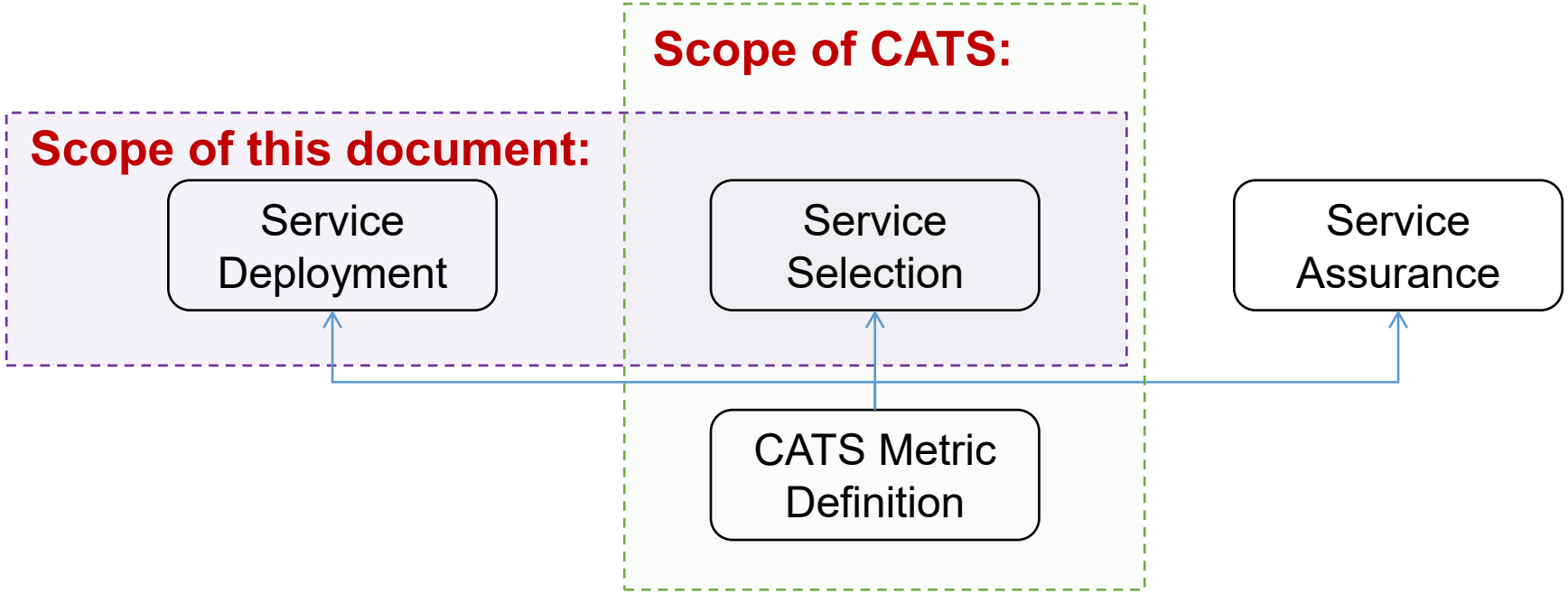
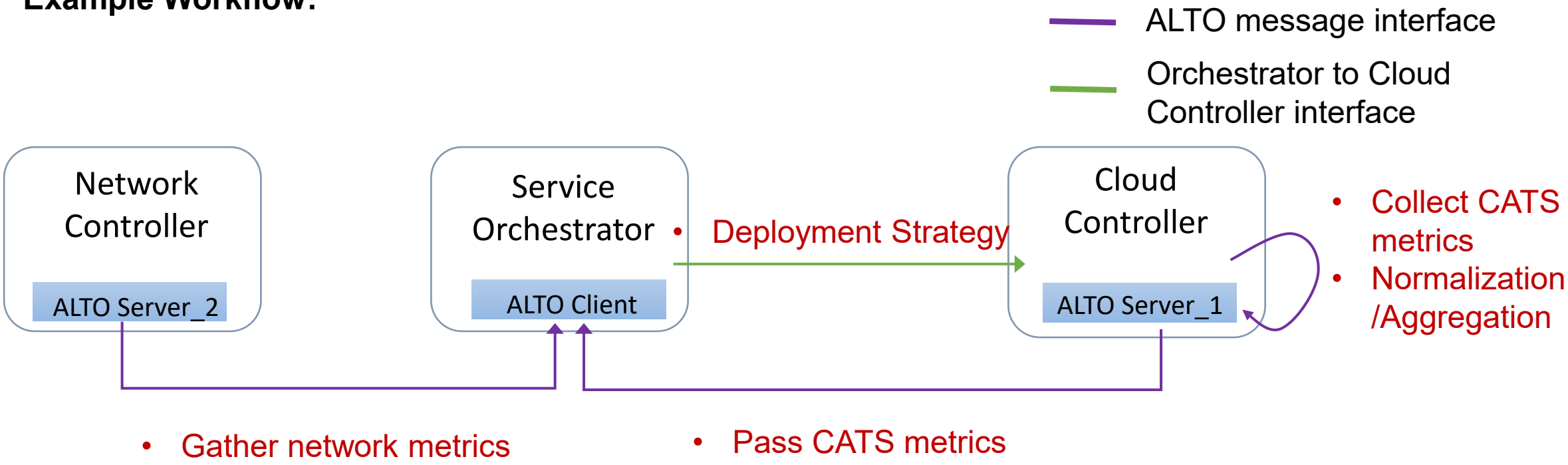
Background and Recap

- CATS metrics exposure/distribution is fundamental for the decision-making of traffic steering.
- CATS metrics exposure also works for service instance deployment.
- ALTO can be seen as one of the possible solutions, an off-path signaling approach.
- Some relavant drafts:
  - draft-rcr-opsawg-operational-compute-metrics-08 -- **General considerations on the lifecycle.**
  - draft-contreras-alto-service-edge-10 -- **One of ALTO's implementation on service placement.**
  - This draft -- **Exposure of CATS metrics, for both traffic steering and service placement.**



ALTO for CATS Service Deployment

- **Components:**
  - ALTO server: **Instantiates C-SMA and C-NMA,** responsible for collecting CATS metrics as well as network metrics, and implementing normalization and aggregation functions.
  - ALTO client: A component responsible for gathering all metrics from the ALTO server and pass them to the orchestrator to generate service placement strategies.
- **Example Workflow:**



ALTO for CATS Service Selection (Traffic Steering)

- **Components:**
  - ALTO server: **Instantiates C-SMA and C-NMA**, responsible for collecting CATS metrics as well as network metrics, and implementing normalization and aggregation functions.
  - ALTO client: **Instantiates C-PS**, responsible for gathering all metrics from the ALTO server and pass them to the controller to generate traffic steering strategies.
- **Considerations on applying the protocol for traffic steering implementation:**
  - The ALTO server can be placed in the cloud controller.
  - The ALTO client can be placed in the network controller.
  - The network controller implements C-PS.
  - The network controller can collect network metrics and send routing policies using existing protocols.
  - It is an off-path mechanism.
  - It is applicable to both CATS centralized and hybrid approaches.

ALTO Extensions and Encoding

- Extend ALTO endpoint cost service according to RFC 7285


```
{
  "meta": {
    "cost-types": {
      "L2-metric": {
        "metric-type": "Fully normalized metric",
        "level": "L2",
        "cost-mode": "numerical",
        "cost-metric": "normalized-value"
      },
      "L1-metric": {
        "metric-type": "Compute metric",
        "level": "L1",
        "cost-mode": "numerical",
        "cost-metric": "normalized-value"
      },
      "L0-metric": {
        "metric-type": "CPU frequency",
        "level": "L0",
        "cost-mode": "numerical",
        "cost-metric": "GigaHertz"
      }
    }
  }
}
```


- metric type
- metric level
- cost-mode
- cost-metric

“Cost-type” Extension


```
{
  "meta": {
    "dependent-vtags": [
      {
        "resource-id": "my-default-networkmap",
        "tag": "3ee2cb7e8d63d9fab71b9b34cbf764436315542e"
      }
    ]
  },
  "endpoint-properties": {
    "ipv4:192.0.2.34": {
      "Fully normalized metric": {
        "level": "L2",
        "value": 5
      }
    },
    "ipv4:203.0.113.56": {
      "Compute metric": {
        "level": "L1",
        "value": 3
      },
      "CPU frequency": {
        "level": "L0",
        "value": "2.2 GigaHertz"
      }
    }
  }
}
```


- Enpoint address
- metric type
- metric level
- metric value

ALTO Encodings

Next Steps

- Collect feedback on whether CATS metrics exposure using ALTO extensions can been seen as one of the possible solutions (an off-path signaling approach).
- If so, the extension of the protocol could be done in OPSAWG or other WGs.
- Add workflows of service selection in the next revision.
- Solicit further comments and contributions.

THANKS!