

Service Assurance for Intent-based Networking Architecture & YANG Modules for Service Assurance

[draft-claise-opsawg-service-assurance-architecture-01](#)
[draft-claise-opsawg-service-assurance-yang-02](#)

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Issues

- A service being configured doesn't mean it's operating correctly
- Too much data in telemetry: needle in a haystack
- When a service degrades, where is the fault?
 - what are the symptoms?
 - what is the root cause?
- When a network component fails, which services are impacted?
- How to solve closed loop automation, as a first step?

Proposal

- The end goal: self-healing/driving/whatever networks or intent-based networking
- Intent: the top down approach, declarative way is a nice concept
 - Mainly working for greenfield deployments
 - We have to solve this differently
- Service Assurance for Intent-based Networking Architecture proposal
 - Decompose the problem into smaller components
 - Those components are assured independently
 - Complement the end-to-end synthetic tests

Assurance Graph

Service Instance



```
+-----+
| Tunnel |
| Service Instance |
+-----+
```

|

```
+-----+
```

|

|

|

```
+-----+
| Peer1 |
| Tunnel |
| Interface |
+-----+
```

```
+-----+
| Peer2 |
| Tunnel |
| Interface |
+-----+
```

```
+-----+
| IP |
| Connectivity |
| |
+-----+}
```

|

|

|

```
+-----+
| Peer1 |
| Physical |
| Interface |
+-----+
```

```
+-----+
| Peer2 |
| Physical |
| Interface |
+-----+
```

```
+-----+
| IS-IS |
| Routing |
| Protocol |
+-----+
```

|

|

```
+-----+
| Peer1 |
| Device |
+-----+
```

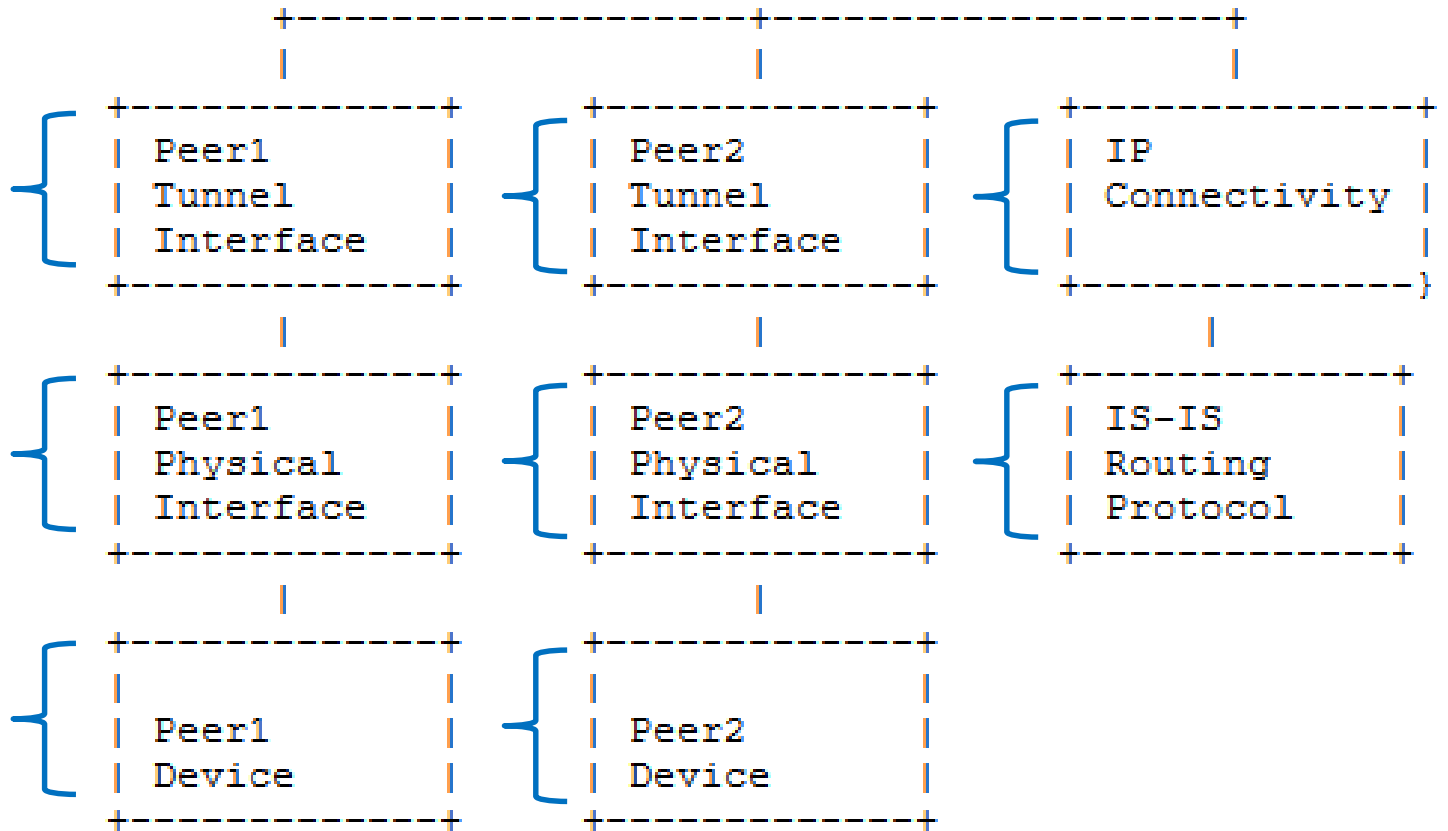
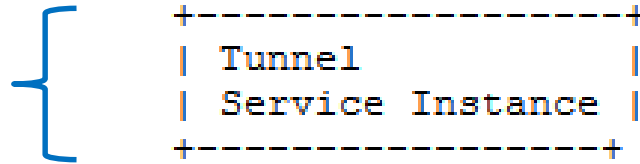
```
+-----+
| Peer2 |
| Device |
+-----+
```

Subservice Instances

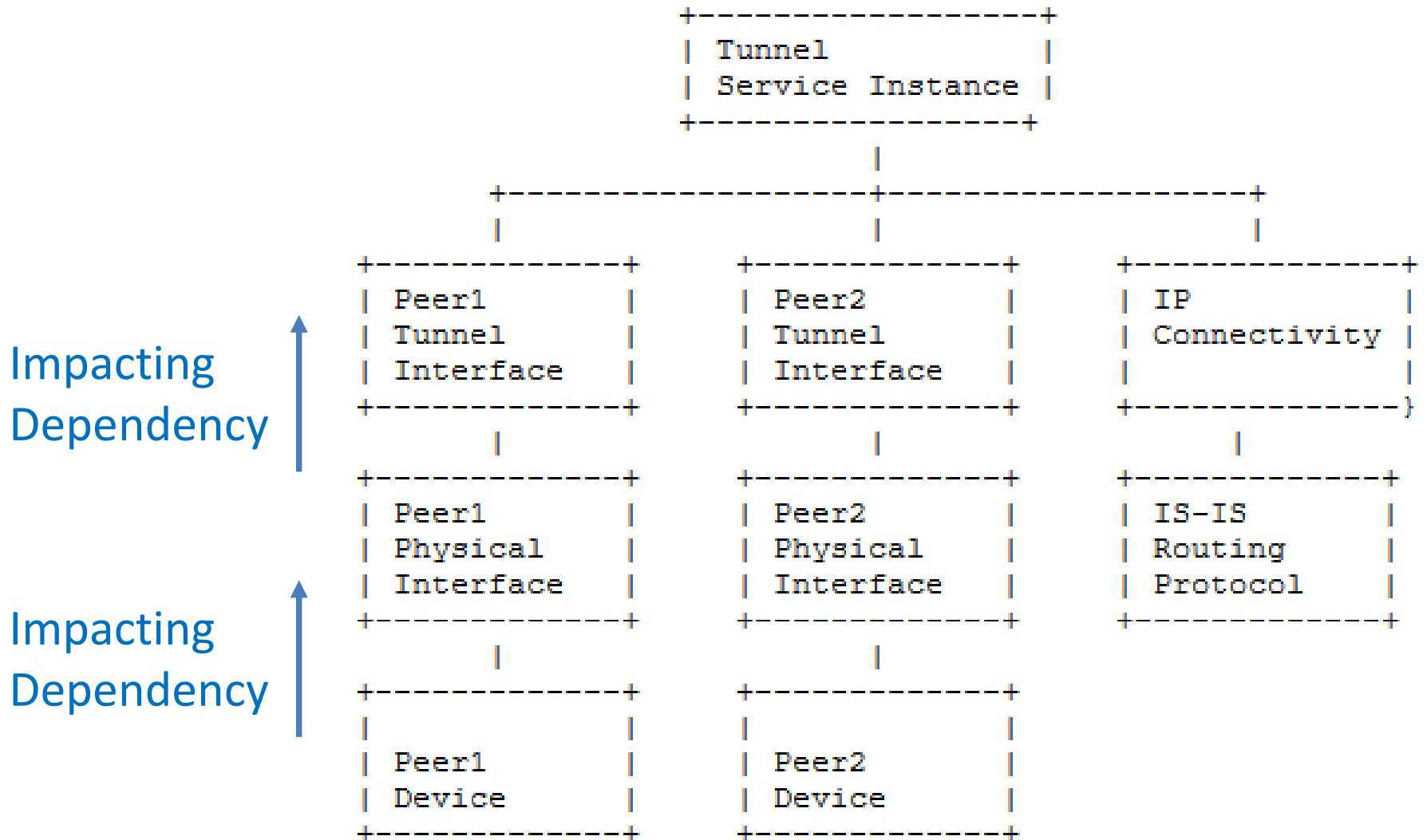


Score & Symptoms

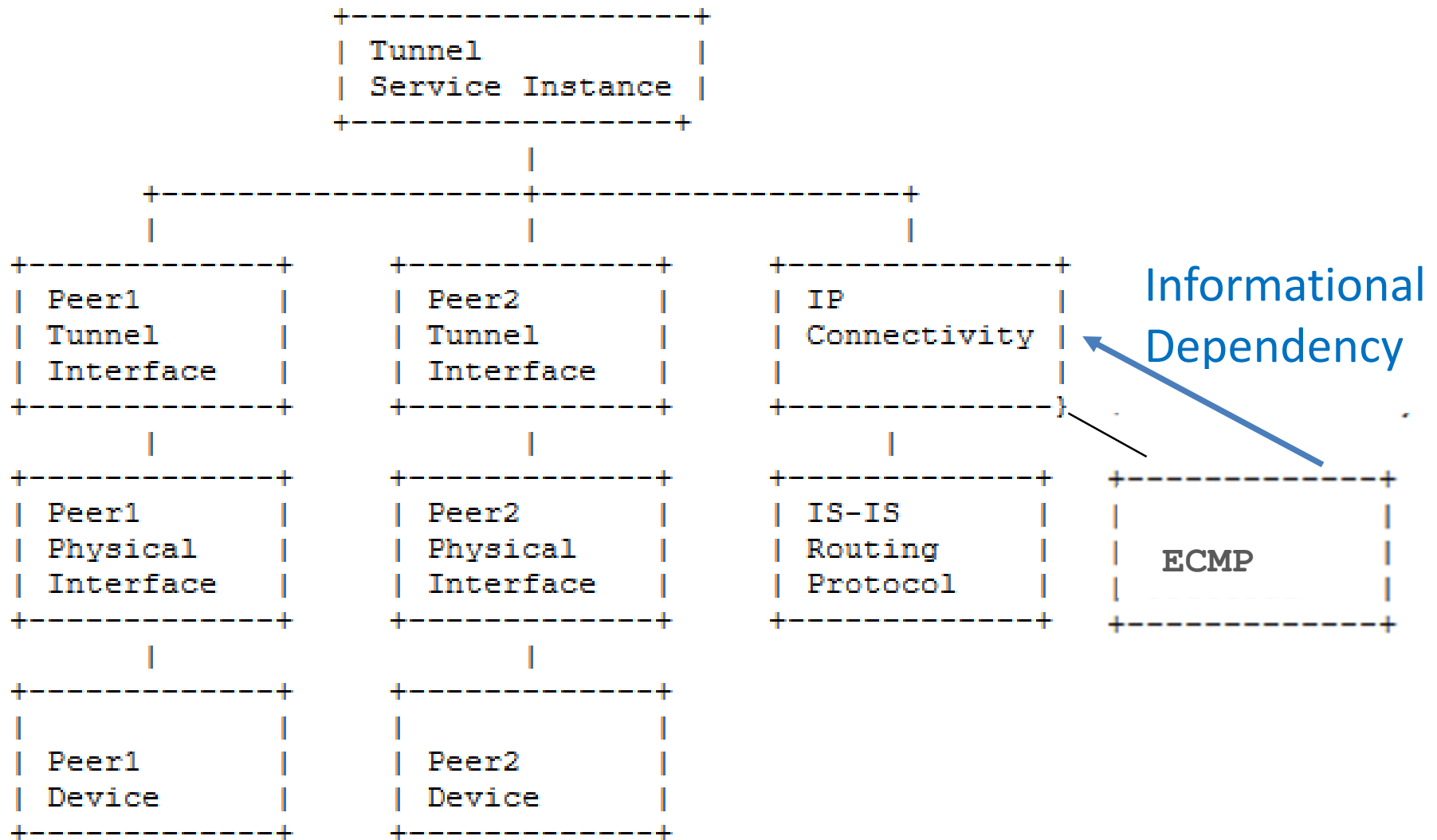
An inferred health score
+ a series of symptoms



(Impacting or Informational) Dependencies



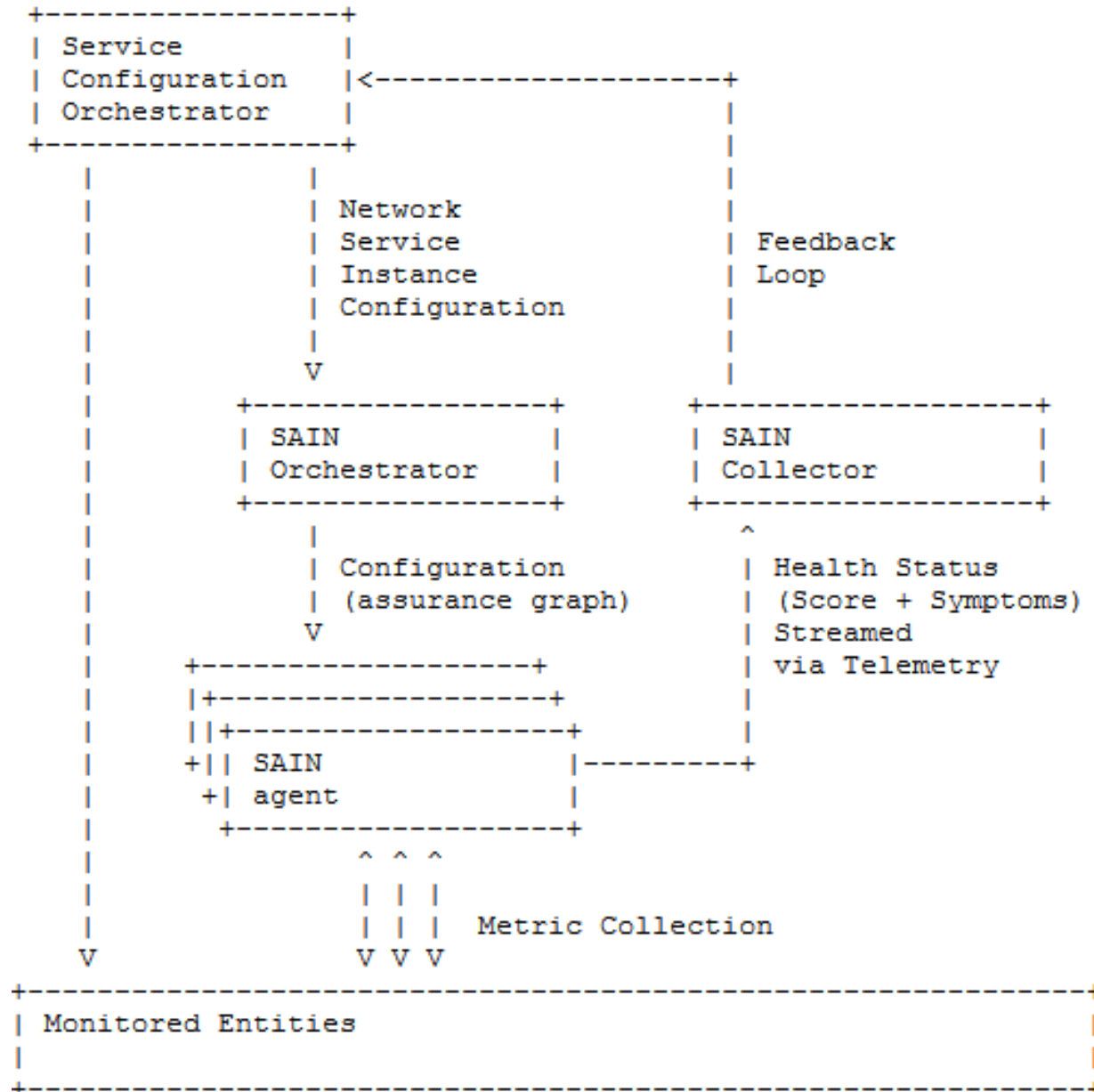
(Impacting or Informational) Dependencies



So far, we know...

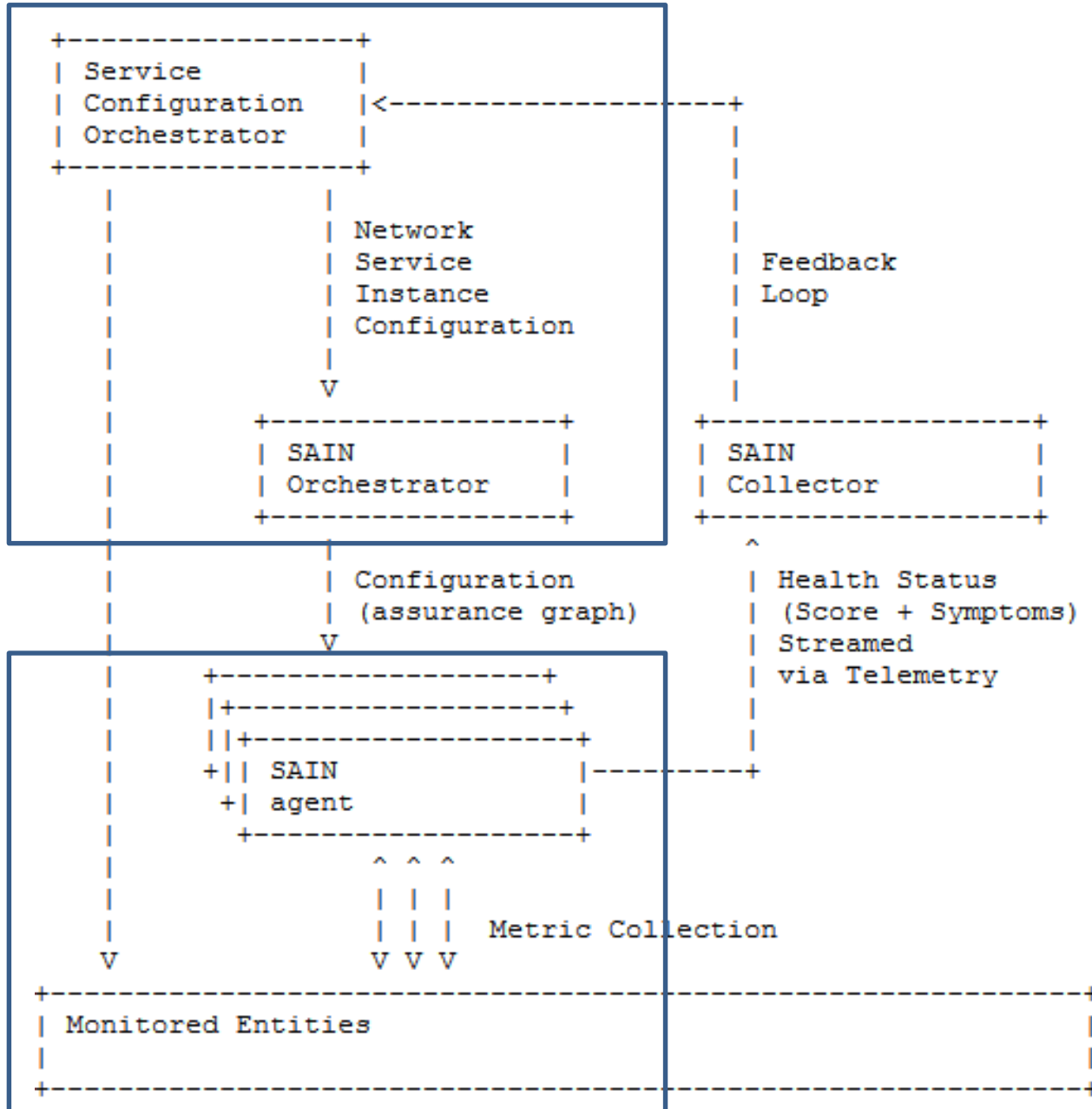
- When a service degrades, where is the fault
 - what are the symptoms?
 - what is the root cause?
- When a network component fails, which services are impacted

Architecture



Flexible Architecture

Could be a single box

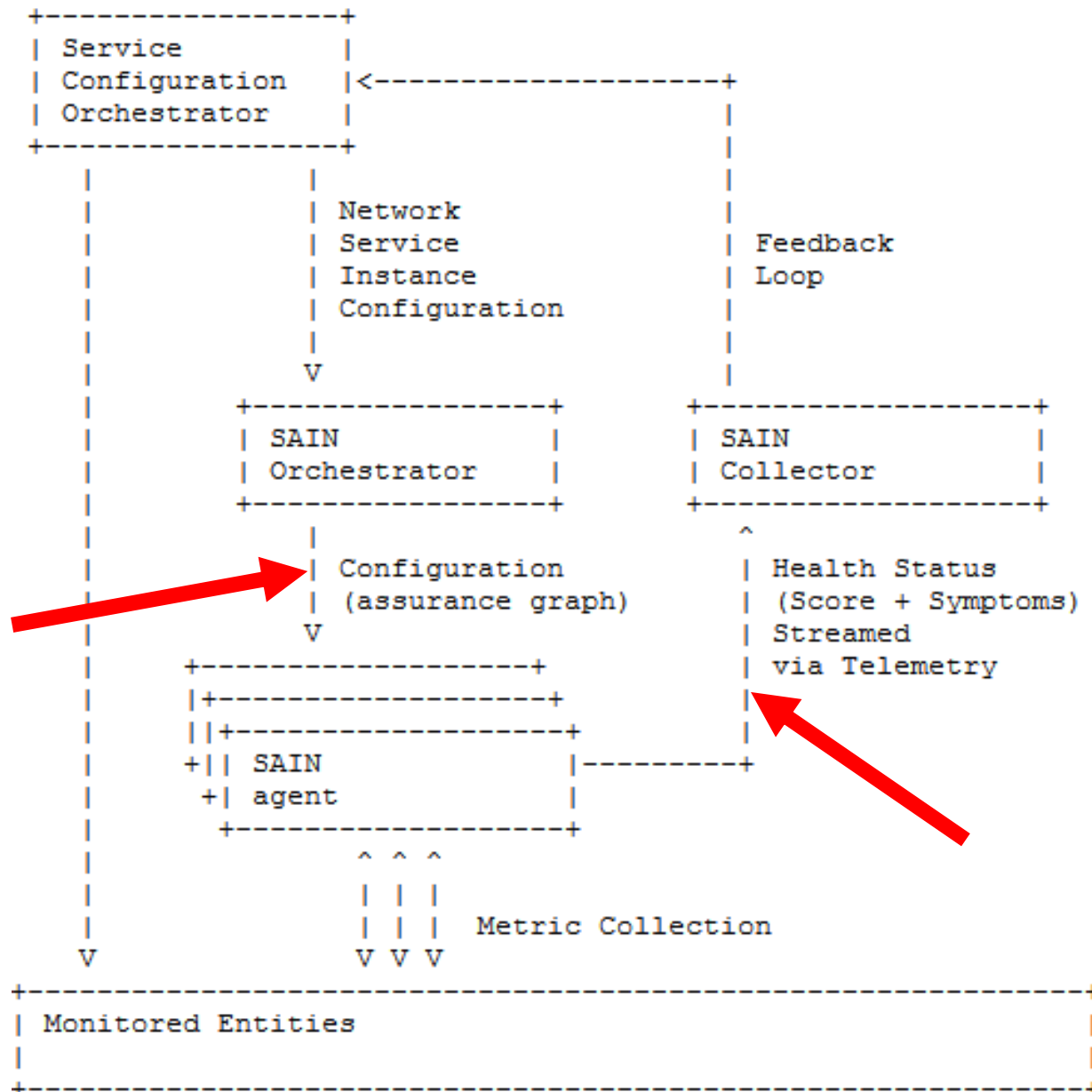


Agent could be in or off routers

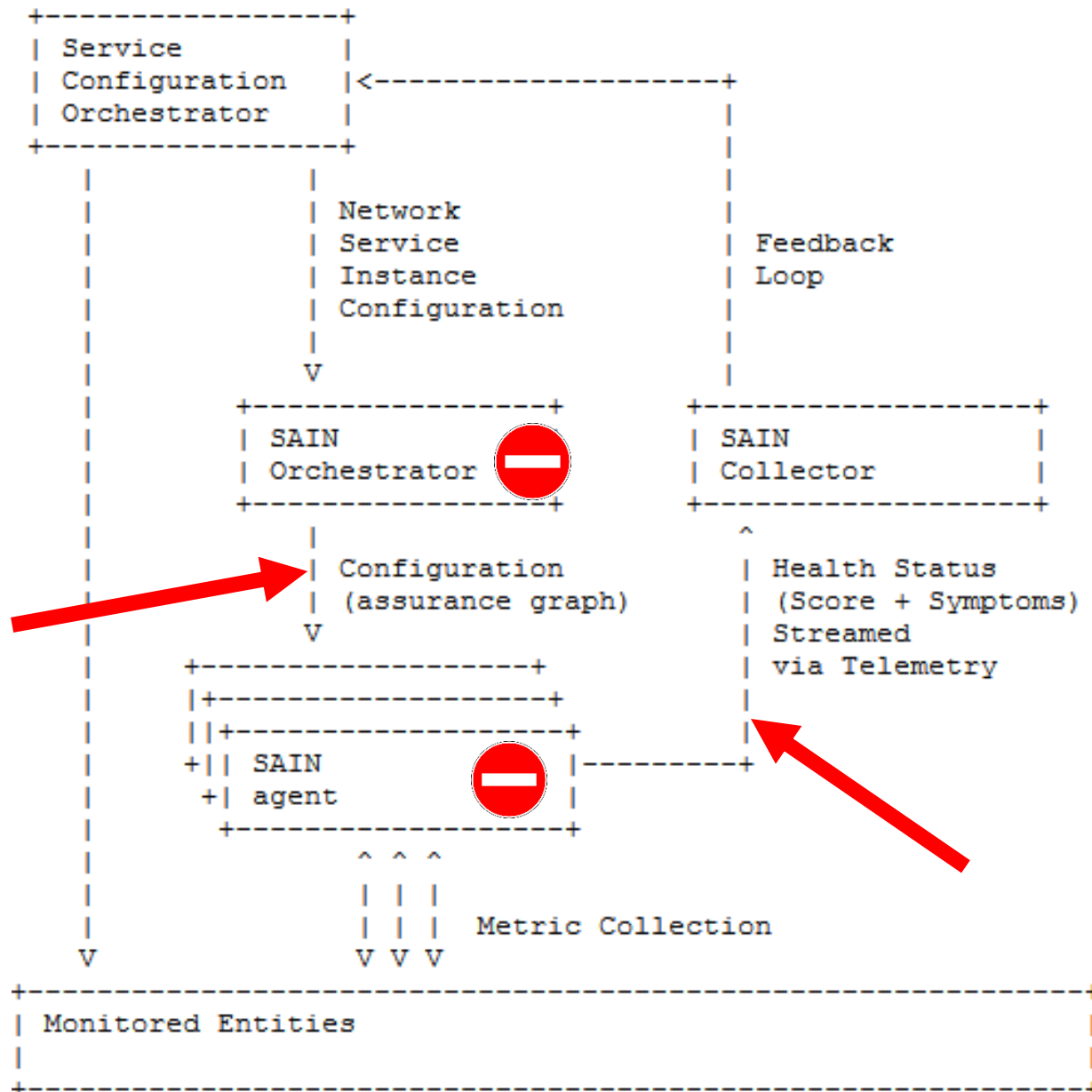
Open Architecture

- Why? multi-vendor
- How? With a YANG module
 - Can augment the YANG module
 - Even for vendor-specific subservices

Open Architecture with YANG Models



Open Architecture with YANG Models



```
module: ietf-service-assurance
+--ro assurance-graph-version? yang:counter32
+--ro assurance-graph-last-change? yang:date-and-time
+--rw subservices
  +--rw subservice* [type id]
    +--rw type identityref
    +--rw id string
    +--ro last-change? yang:date-and-time
    +--ro label? string
    +--rw (parameter)?
      | +--:(service-instance-parameter)
      |   +--rw service-instance-parameter
      |     +--rw service? string
      |     +--rw instance-name? string
    +--ro health-score? uint8
    +--rw symptoms
      | +--ro symptom* [start-date-time id]
      |   +--ro id string
      |   +--ro health-score-weight? uint8
      |   +--ro label? string
      |   +--ro start-date-time yang:date-and-time
      |   +--ro stop-date-time? yang:date-and-time
    +--rw dependencies
      +--rw dependency* [type id]
        +--rw type -> /subservices/subservice/type
        +--rw id -> /subservices/subservice[type=current()/../type]/id
        +--rw dependency-type? identityref
```

Assurance Tree API

module: ietf-service-assurance

+--rw subservices

+--rw subservice* [type id]

+--rw type identityref

+--rw id string

...

+--rw dependencies

+--rw dependency* [type id]

+--rw type -> /subservices/subservice/type

+--rw id -> /subservices/subservice[type=current()/../type]/id

+--rw dependency-type? identityref



Dependency
relationship

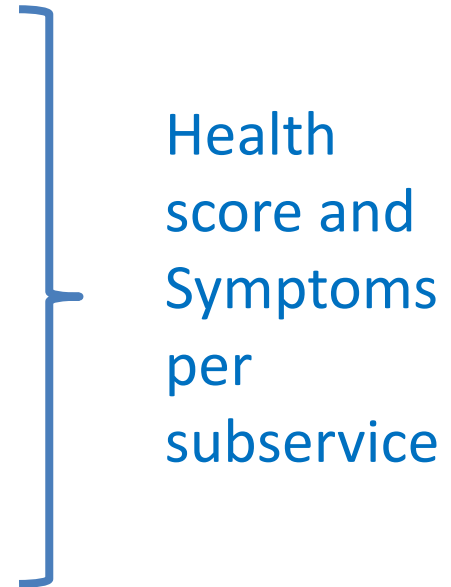
Health Score and Symptoms API

module: ietf-service-assurance

+--ro assurance-graph-version? yang:counter32
+--ro assurance-graph-last-change? yang:date-and-time
+--rw subservices
 +--rw subservice* [type id]

....

+--ro health-score? uint8
+--rw symptoms
 | +--ro symptom* [start-date-time id]
 | +--ro id string
 | +--ro health-score-weight? uint8
 | +--ro label? string
 | +--ro start-date-time yang:date-and-time
 | +--ro stop-date-time? yang:date-and-time



Health
score and
Symptoms
per
subservice

Subservice Parameters API

module: ietf-service-assurance

+--ro assurance-graph-version? yang:counter32

+--ro assurance-graph-last-change? yang:date-and-time

+--rw subservices

+--rw subservice* [type id]

+--rw type identityref

+--rw id string

+--ro last-change? yang:date-and-time

+--ro label? string

+--rw (parameter)?

| +--:(service-instance-parameter)

| +--rw service-instance-parameter

| +--rw service? string

| +--rw instance-name? string



Subservice
Parameters

New Subservices

+--rw (parameter)?

| +--:(service-instance-parameter)

| | +--rw service-instance-parameter

| | +--rw service? string

| | +--rw instance-name? string

| +--:(service-assurance-device:device-idty)

| | +--rw service-assurance-device:device-idty

| | +--rw service-assurance-device:device? string

| +--:(example-service-assurance-device-acme:acme-device-idty)

| +--rw example-service-assurance-device-acme:acme-device-idty

| +--rw example-service-assurance-device-acme:device? string

| +--rw example-service-assurance-device-acme:acme-specific-parameter? string

} New subservice
type

}
New vendor-specific
subservice type

Feedback/Flame/Tomatoes

- Valid problem to solve industry-wide?
- At the IETF?
- Going in the right direction?