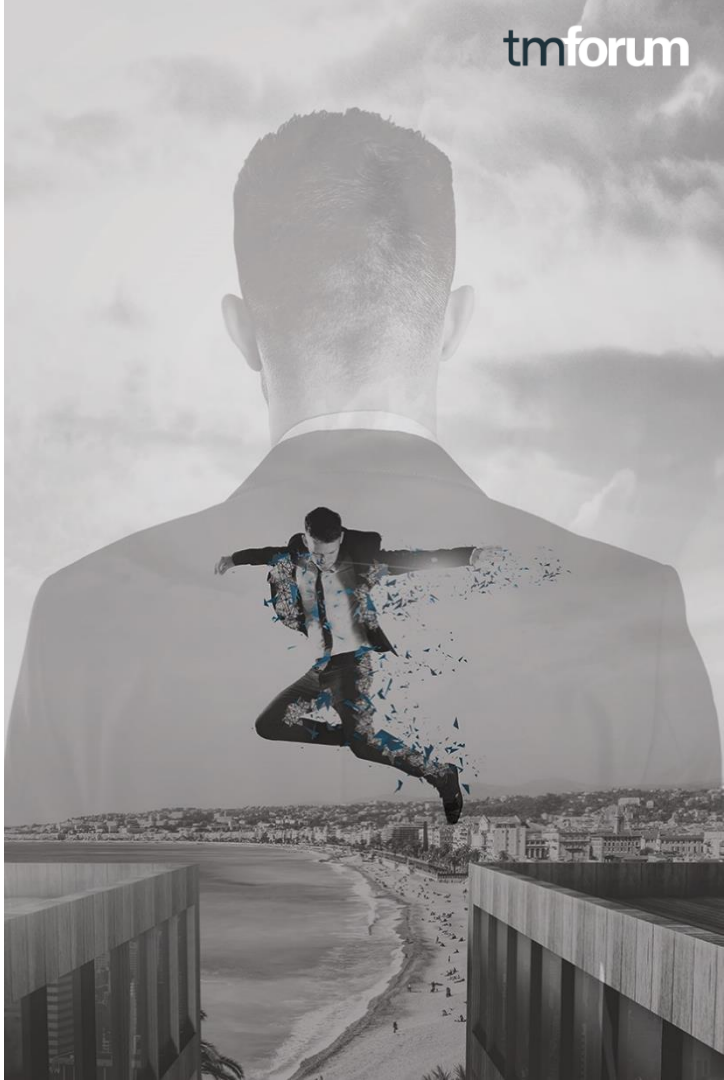
# Agile OSS

## for New Age Services

## &

## Hybrid Networks



# Content Outline

- Network Evolution
- Catalyst Team
- Problem Statement, Scope of improvement
  - Typical PNF Onboarding Approach Today and this is how it impacts Business Agility
  - Scope of Optimization
- Solution approach
  - Solution use cases
  - Benefits
  - TMF assets used
  - Contrbution to TM Forum
- Technical Solution
- Readiness For Commercial Launch & Next Steps

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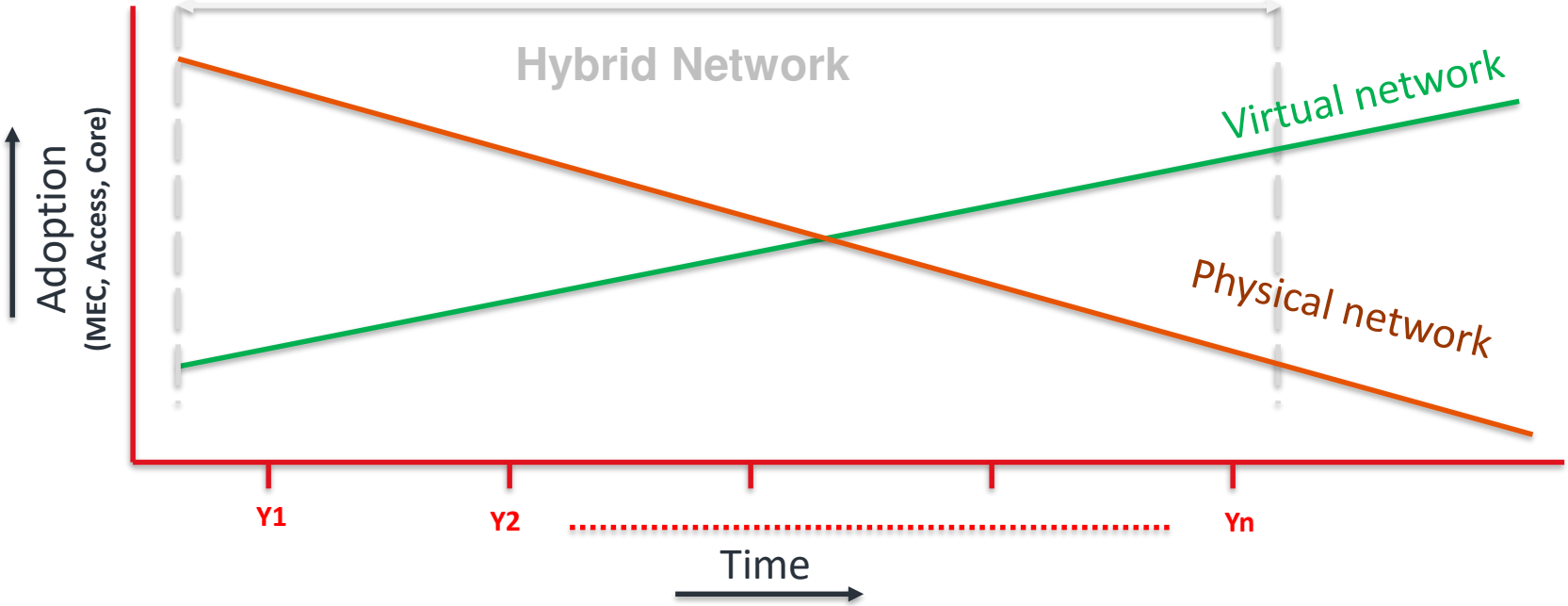
# Network Evolution




As we move with time, the agility and experience expectations are increasing at must faster pace and so to achieve this on hybrid network there is a need to uplift in physical network too.

Catalyst demonstrates how recent modelling standards and automation concepts developed for Virtual networks could be adopted to accelerate Plan & Build of Physical Network

# Catalyst Team

## Project Champion:

BT

**Problem statement:** current cumbersome PNF plan & build process with –

- multiple handoffs
- non-standardization
- lack of automation

slowing down product launch over hybrid network

**Vision:** Build Next Generation Plan and Build (NG P&B) solution demonstrating power of NetOps to significantly reduce PNF onboarding time.

## Catalyst Lead

Infosys

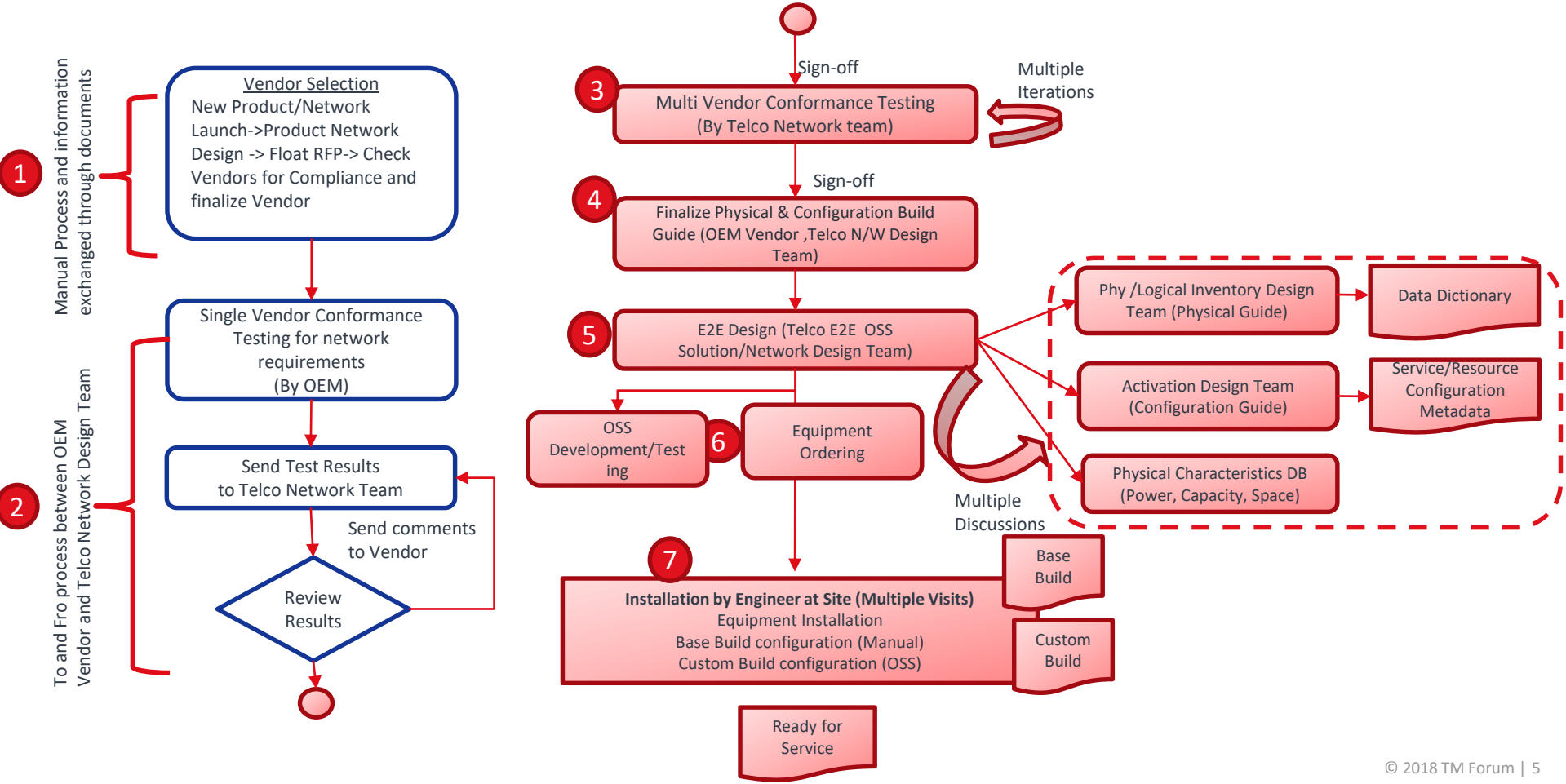
**Contribution:** Building NG P&B platform leveraging standards like YANG to speed up PNF onboarding.

## Participant

TTG International Ltd.

**Contribution :** Consume YANG to model PNF and support life cycle management

# Typical PNF Onboarding Approach Today…

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# ...and this is how it impacts Business Agility

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## New Equipment launch process…

## Equipment upgrade (addition of new card etc.) process…

*Total 6-8 months of Plan & build depends on complexity, OSS team's capacity, business priority and release cycle when request is submitted by Business.

SVCT – Signer Vendor Conformance Testing
MVCT – Multi Vendor Conformance Testing

# Focus of this Catalyst

**Unlike VNF which can be spun in real-time, dedicated P&B for physical network is major bottleneck for speedy product launch around hybrid network.**

1. Any new equipment modelling/meta data creation or existing Equipment model/meta-data modification requires demand prioritization and alignment to a typical release (~6 months)

2. Once demand is aligned to Release –
    1. OSS E2E designers to run design calls with network designer and OSS component designers to produce component specific Equipment model/meta-data
    2. Any further implementation (configuration/code change) will go though development → CST → E2E testing → UAT → Live

# Why Current P&B is time consuming?

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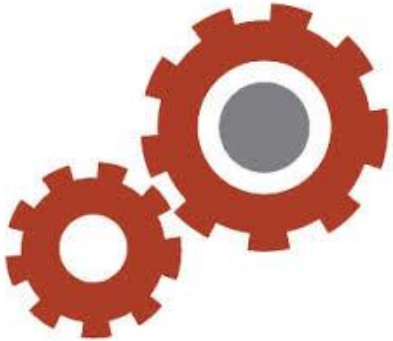
**P & B**

**Different teams and roles**

**Different formats used via components for device modelling**



**Software release cycle commitment**

# Different Formats for different Components

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NETWORK ELEMENT

| Network Element Name | Model | Version | Usage |
|---|---|---|---|
| MEAD | ATN-910 | (N/A) | ALL usage of ATN910 |

Abb. KEY

| | |
|---|---|
| Fill Colour | |
| Fill Colour | |
| Fill Colour | |

SHELF

Equipment Information (SHELF)

| Name | Model | Version |
|---|---|---|
| CORE | ATN-910 | (N/A) |

Equipment Holder Information (SHELF HOLDER)

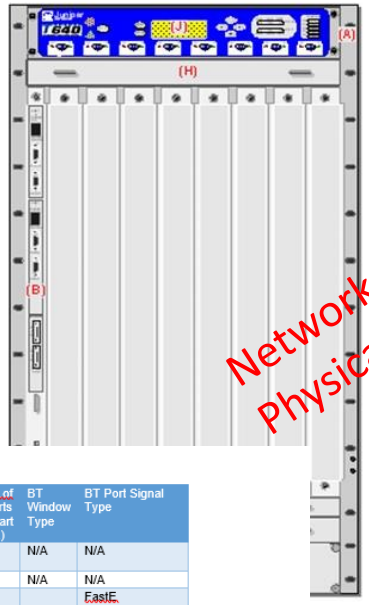
| Logical | MTOSI Slot Name | Prop. Slot Name |
|---|---|---|
| CORE SHELF | /shelf-1 | /shelf-1 |

Equipment Holder Information (Shelf Slots)

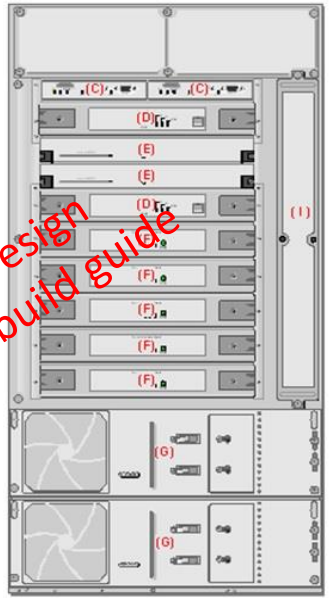
| Logical | MTOSI Slot Name | Prop. Slot Name |
|---|---|---|
| Fan | /shelf-1/slot-<n> | /shelf-1/slot-0/sub_slot-<n> |
| PWR | /shelf-1/slot-5 | /shelf-1/slot-5 |
| FAN | /shelf-1/slot-6 | /shelf-1/slot-6 |
| DUMMY | /shelf-1/slot-7 | /shelf-1/slot-7 |

Component Design 1
Data Dictionary

Front View




Rear View




Network Design
Physical build guide

SHELF LEVEL CARDS (LEVEL 1)

```
/* XXXX YANG
*/

module deviceXXXX_v_1_0 {
     namespace "http://yang.vendorx.net/yang/1.0/alm";
     prefix alm;

     organization
          "Vendor X";

     description
          "ALOS YANG module for configuration hierarchies
     revision "2018-03-27" {
          description "Initial revision.";
     }

     container Chassis {
          config true;
          list equipment {
               key position;
               min-elements 3;
               max-elements 3;
               leaf position {
                    type uint32;
```

Component Design 2
Equipment YANG

**Level 1 Card**

| Card Name (30) | Model(30) | (Version) | No of Slots (Start no.) | No of Ports (Start no.) | BT Window Type | BT Port Signal Type |
|---|---|---|---|---|---|---|
| Power Interface | ANG1POWER | (N/A) | 0 | 0 | N/A | N/A |
| Fan Board | ANG1FAN | (N/A) | 0 | 0 | N/A | N/A |
| Main processing unit | ANG1CXPH | (N/A) | 20 | 8 | | FastE |
| ELSP Card | ELSP | (N/A) | 0 | 1 | N/A | ELSP |
| Virtual Dummy Card | Virtual Dummy Card | (N/A) | 0 | 1 | N/A | |

**Level 2 Card:**

| Card Name (30) | Model(30) | (Version) | No of Slots (Start no.) | No of Ports (Start no.) | BT Window Type | BT Port Signal Type |
|---|---|---|---|---|---|---|
| 10G Optical Transceiver SFP+ | 10GBase-SR | (N/A) | 0 | 1 | SR | 10GigE |
| 10G Optical Transceiver SFP+ | 10GBase-LR | (N/A) | 0 | 1 | LR | 10GigE/FastE |

Component Design n

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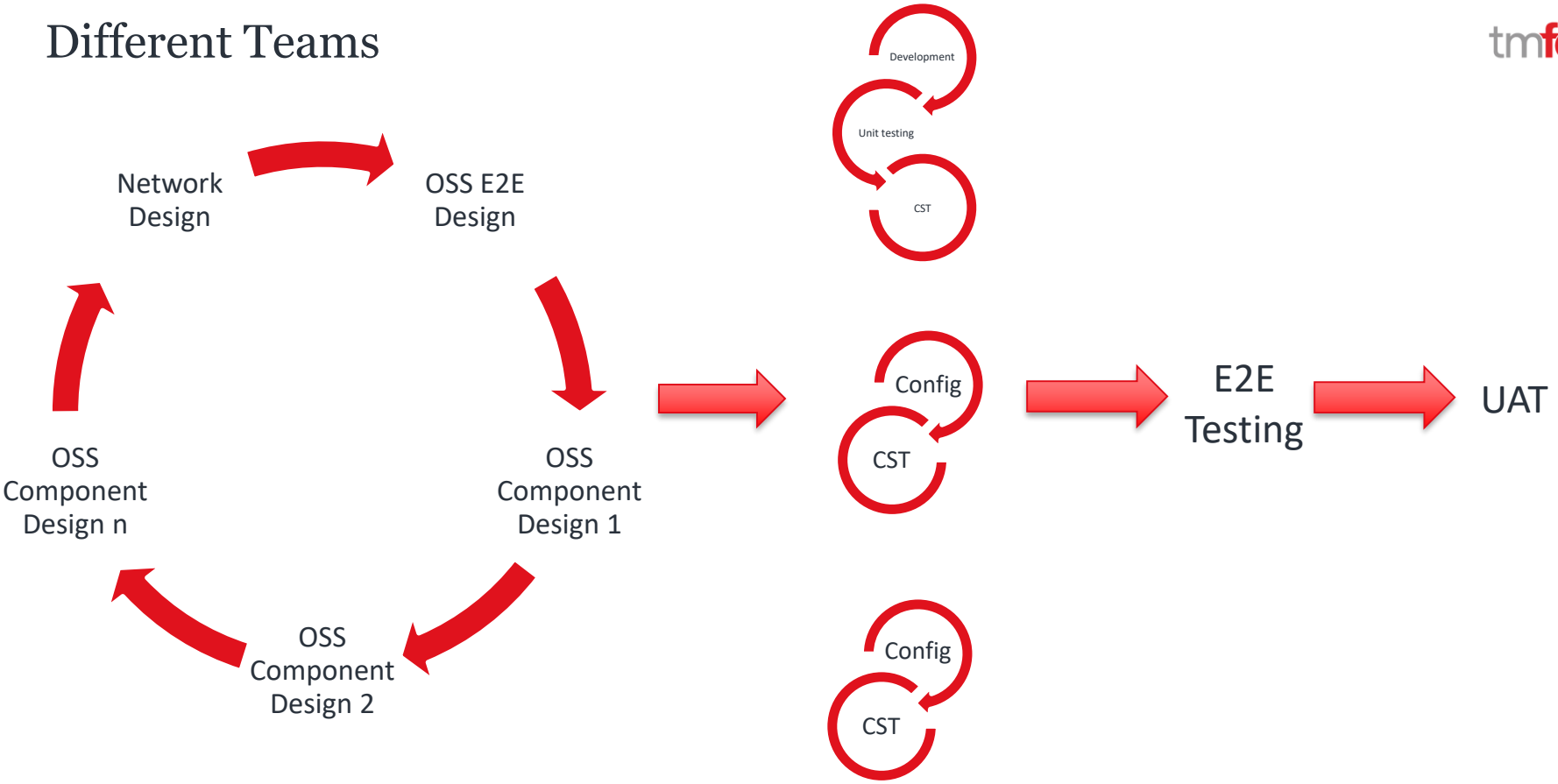
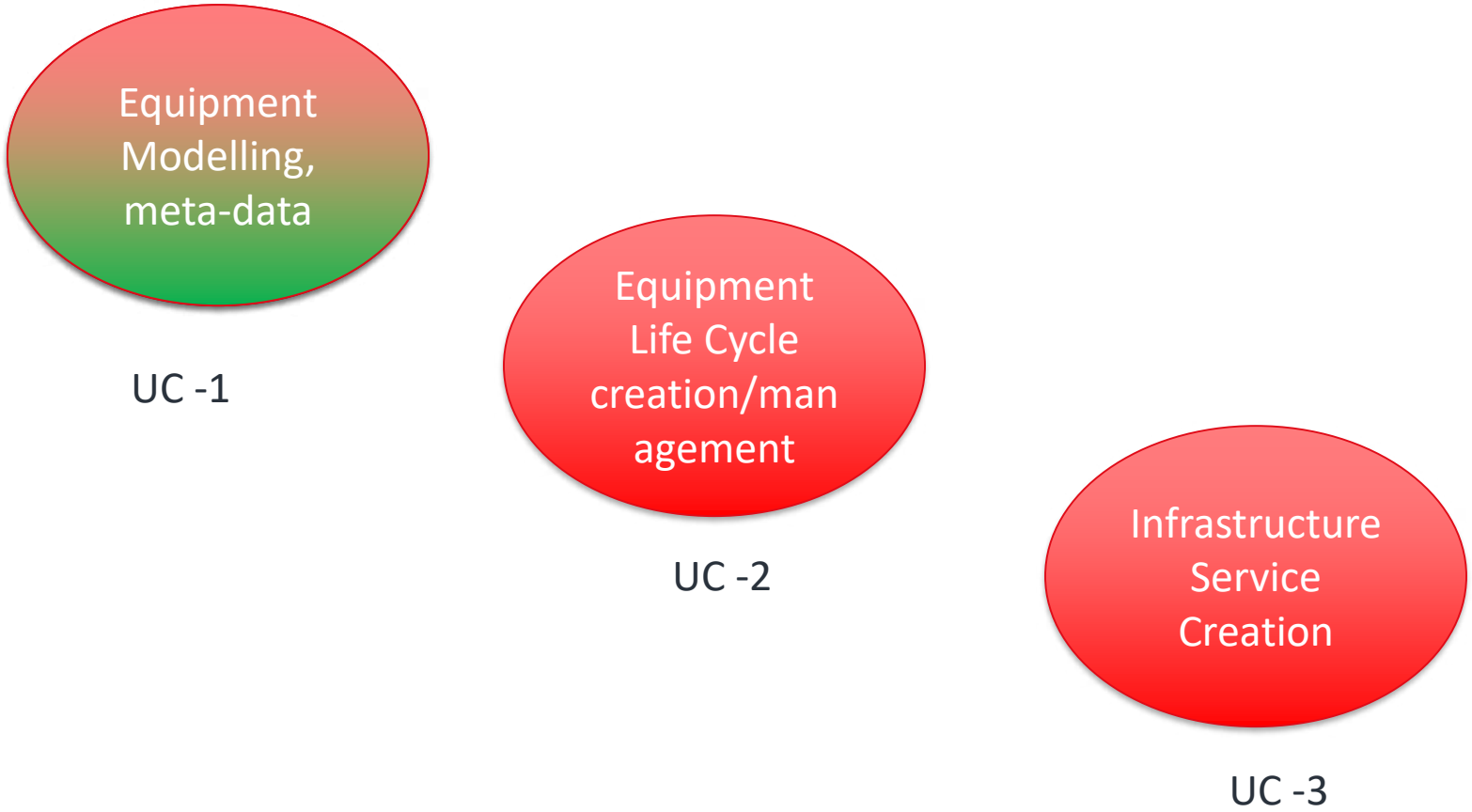
# Different Teams

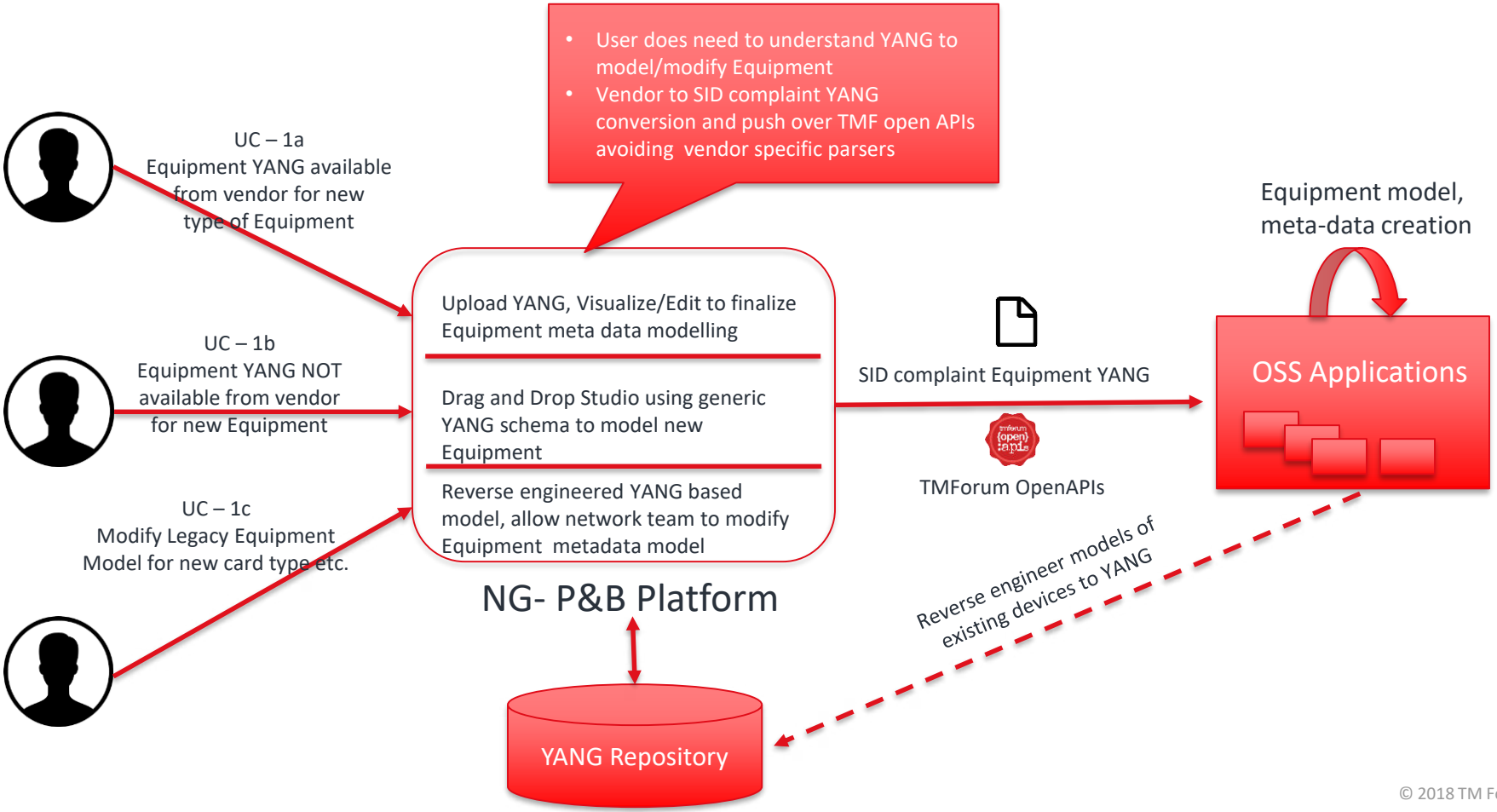



Device modelling, mete-data creation in OSS Systems

# Scope of Optimization in PNF P&B



# Solution Approach for Equipment modelling

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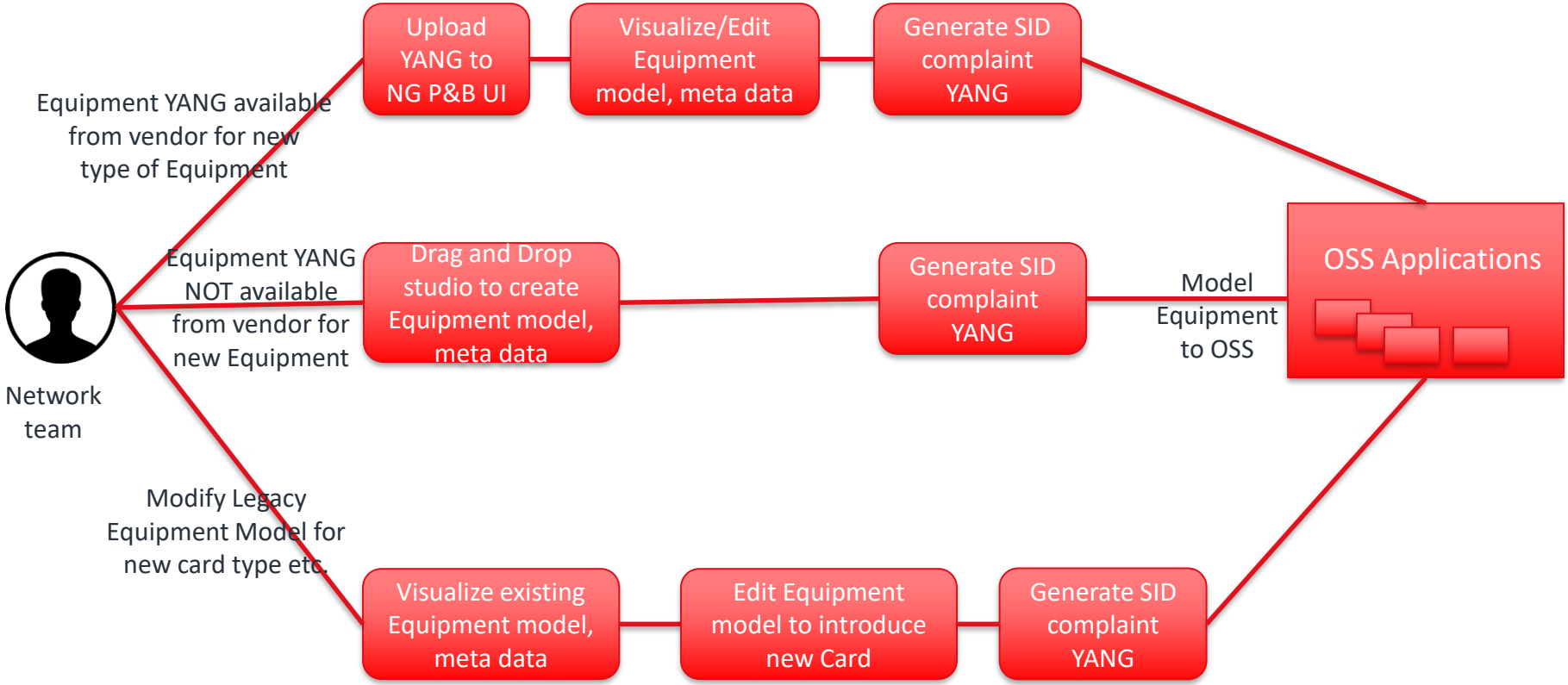
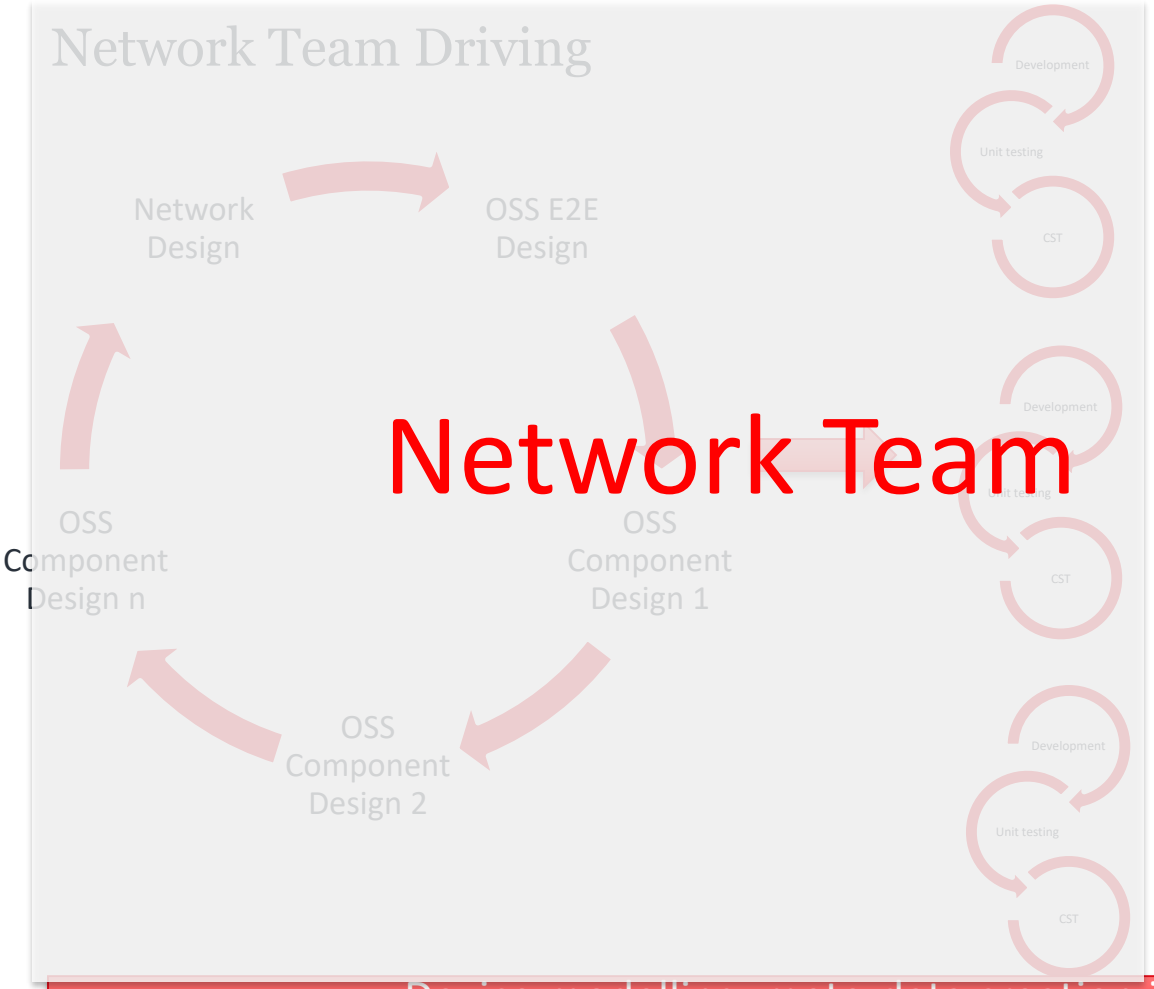
# Solution Flow



# Few standard Formats

```
/* XXXX SR-a4 YANG
*/

 module deviceXXXXsr-a4_v_1_0 {
      namespace "http://yang.vendorx.net/yang/1.0/alm";
      prefix alm;

      organization
            "Vendor X";

      description
            "ALOS YANG module for configuration hierarchies";
      revision "2018-03-27" {
            description "Initial revision.";
      }

      container Chassis {
            config true;
            list equipment {
                  key position;
                  min-elements 3;
                  max-elements 3;
                  leaf position {
                        type uint32;
                  }
                  leaf model {
                        type enumeration {
                              enum PSU;
                              enum Fan-Tray;
                              enum 'IOM-a';
                        }
                  }
                  choice equipment-type {
                        case PSU {
                              uses power-supply-unit-data;
```

YANG




# Network Team

E2E Testing

UAT

Device modelling, mete-data creation in OSS Systems

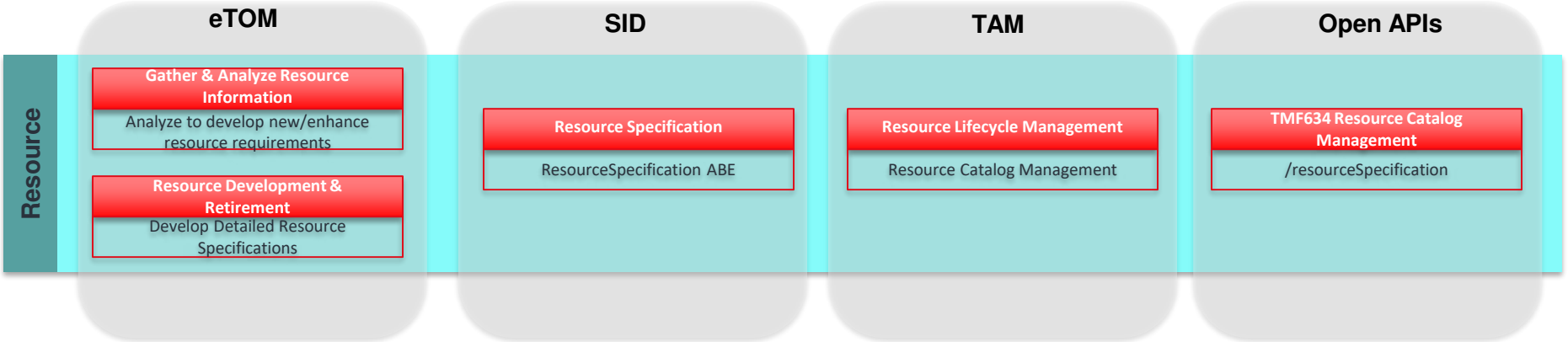
# NG-P&B solution Benefits

Faster product launch on hybrid network via quick PNF onboarding through E2E Automation and Standardization

NetOps – Agile delivery of network
Network team to automatically push equipment models to OSS

Common standards to be used for PNF and VNF

# TMF Assets used …




# … and Contributions

1. A reference implementation for automated PNF onboarding, for both SID as well as non-SID complaint OSS applications. Solution can be extended as a P&B lab for quick intro of the products & services

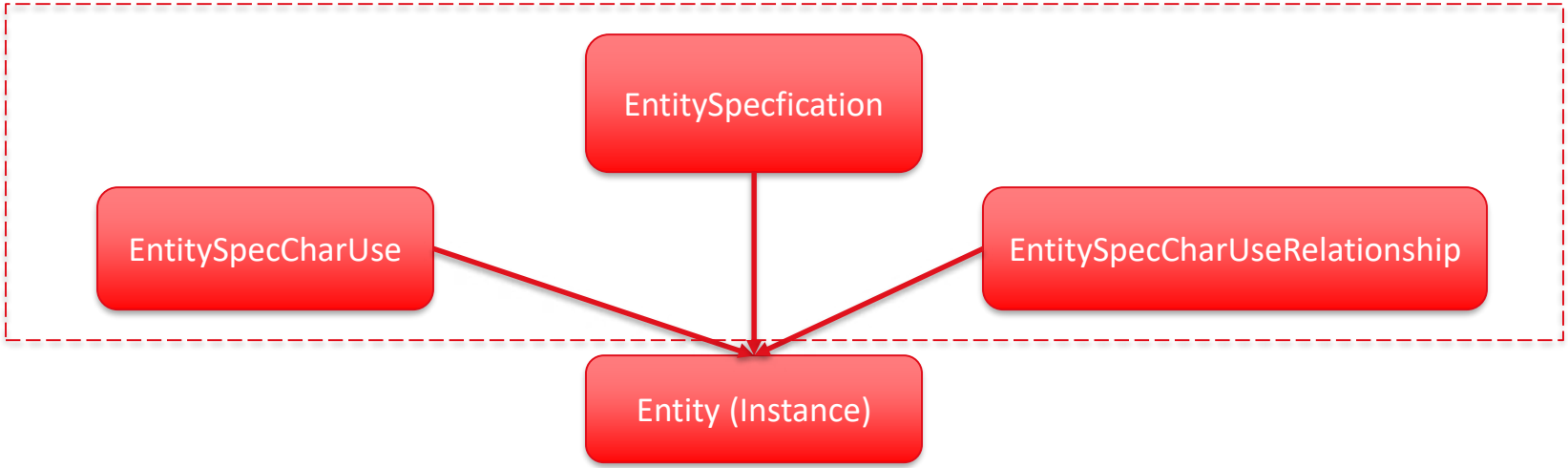
2. A Set of SID compliant Model extracted out of PNF YANG Schema, that could be released to the community as best practice toolkit for PNF onbaording

# /resourceSpecification Open API implementation

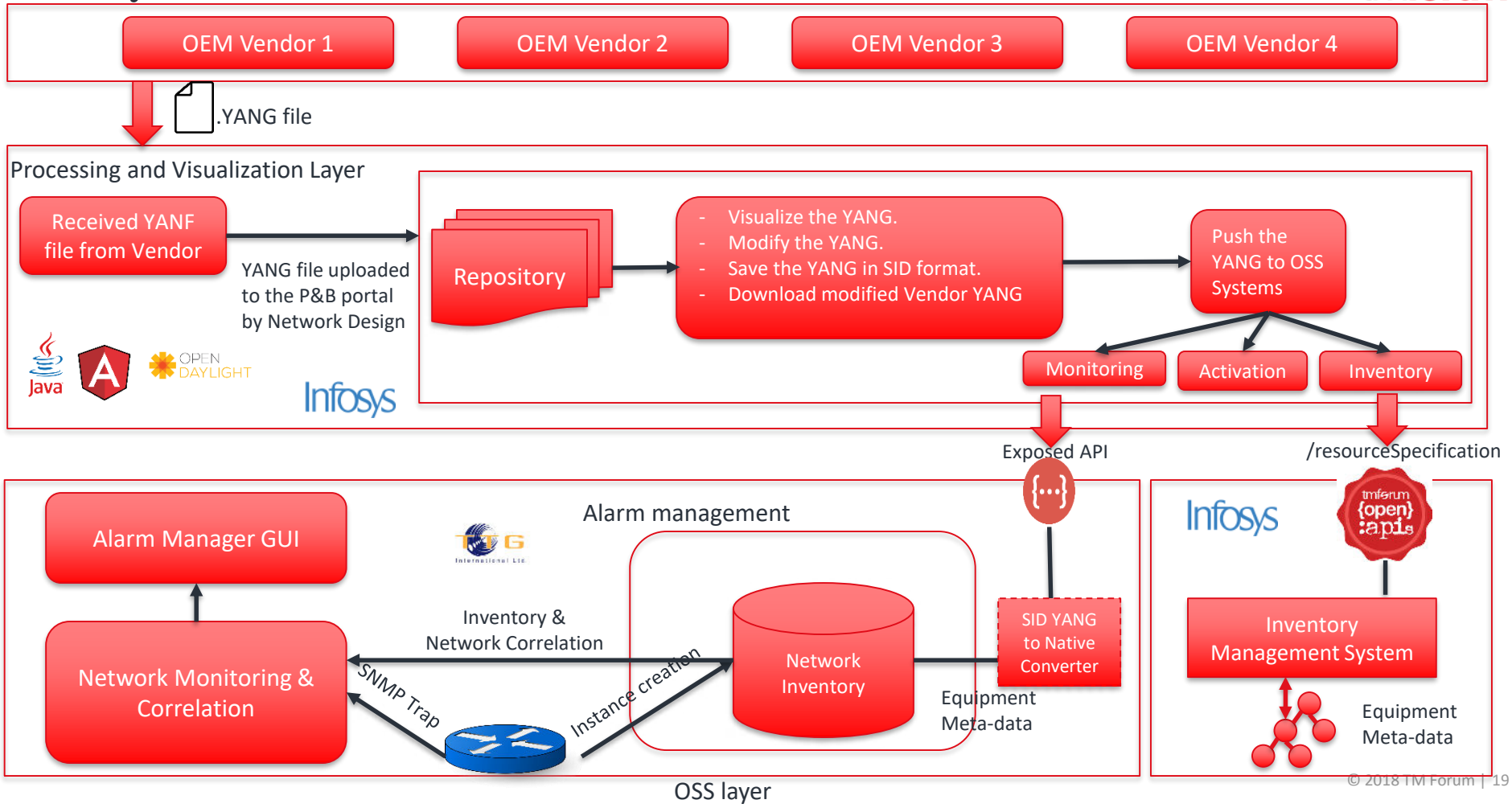
TMF OpenAPI CREATE PHYSICAL RESOURCE SPEC is used for creating meta-data for a SID compliant data model. The YANG file gets parsed and the information from the YANG file is primed into the SID compliant meta-data.

**Implementation**:

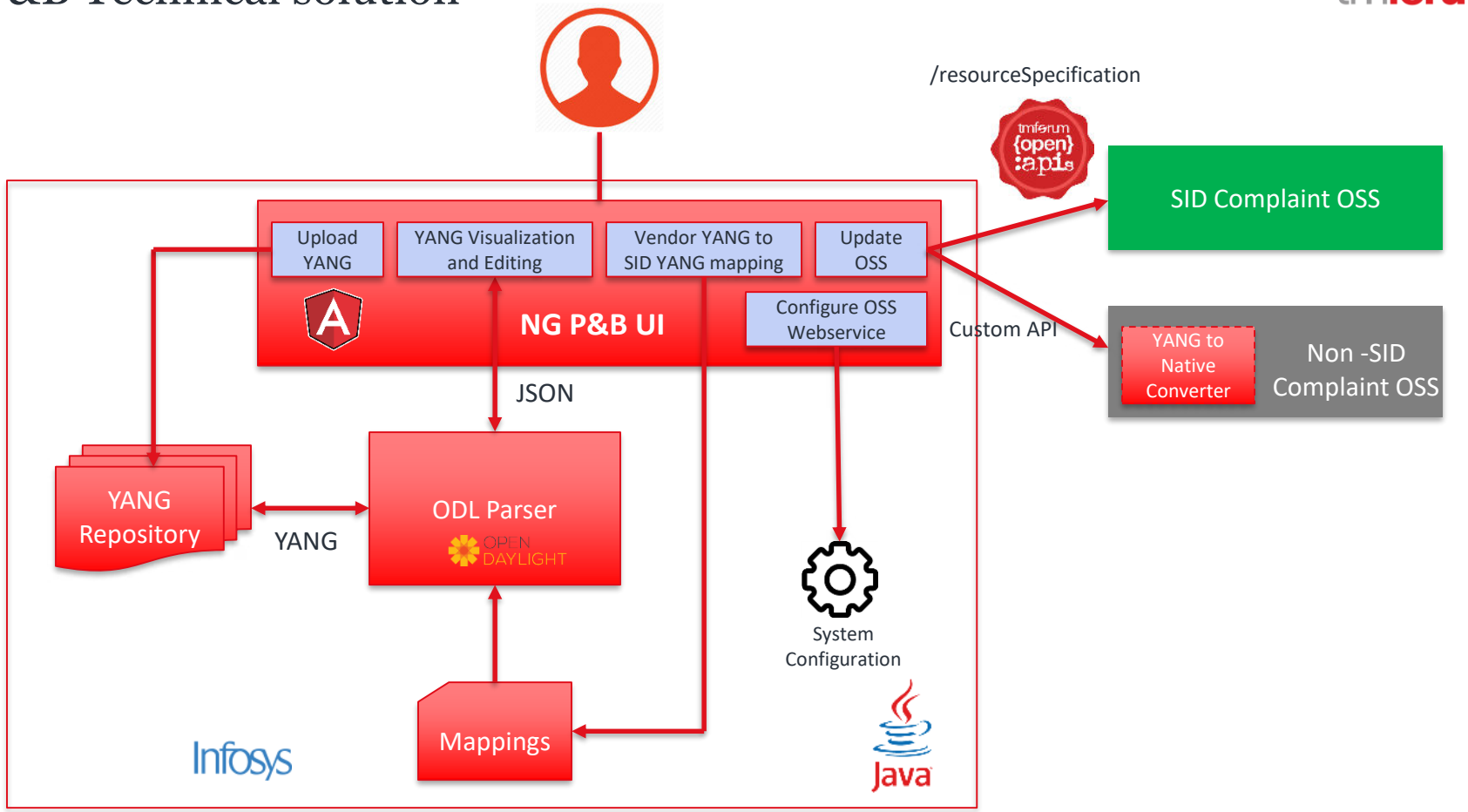
- **EquipmentSpec** – Uses name,@type attributes of the API to build the specifications
- **EquipmentPositionsOccupiedCompatibility** and **EquipmentMountingPositionCompatibility** - Uses **resourceSpecCharacteristic** and **resourceSpecRelationship** to build the compatibility matrix for the meta-data



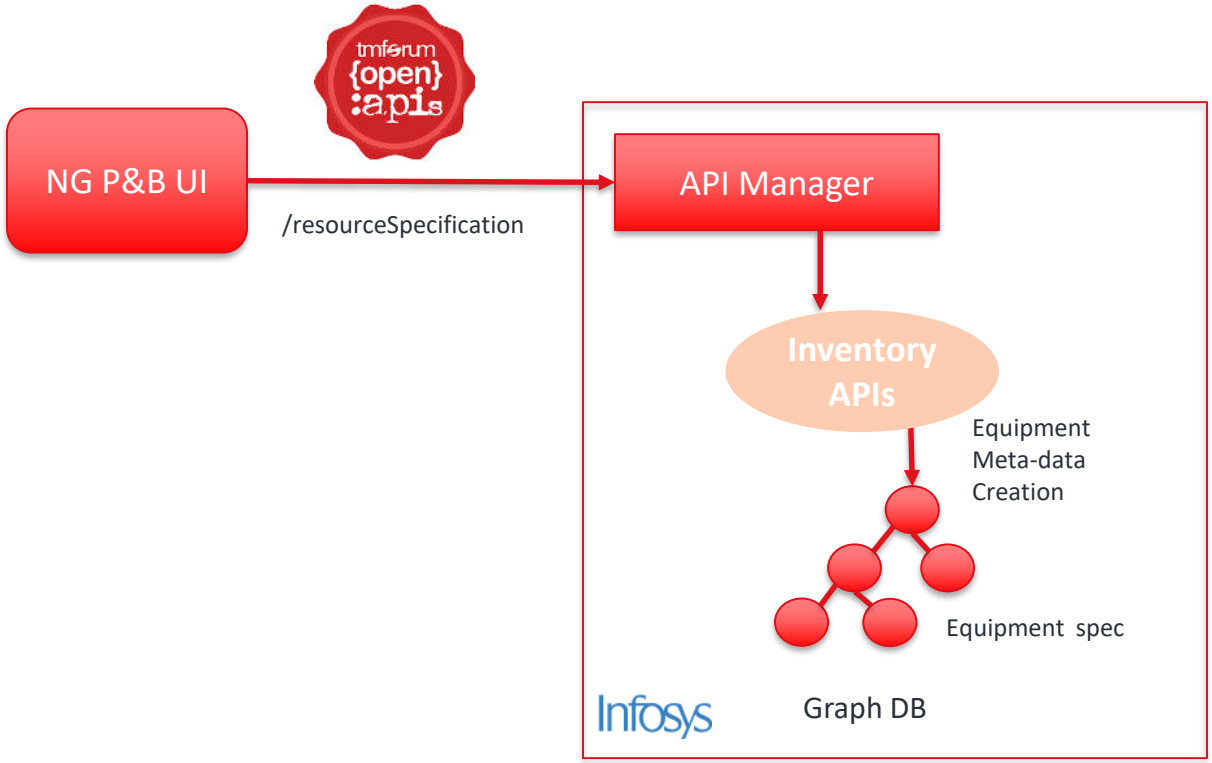
# Catalyst Technical solution



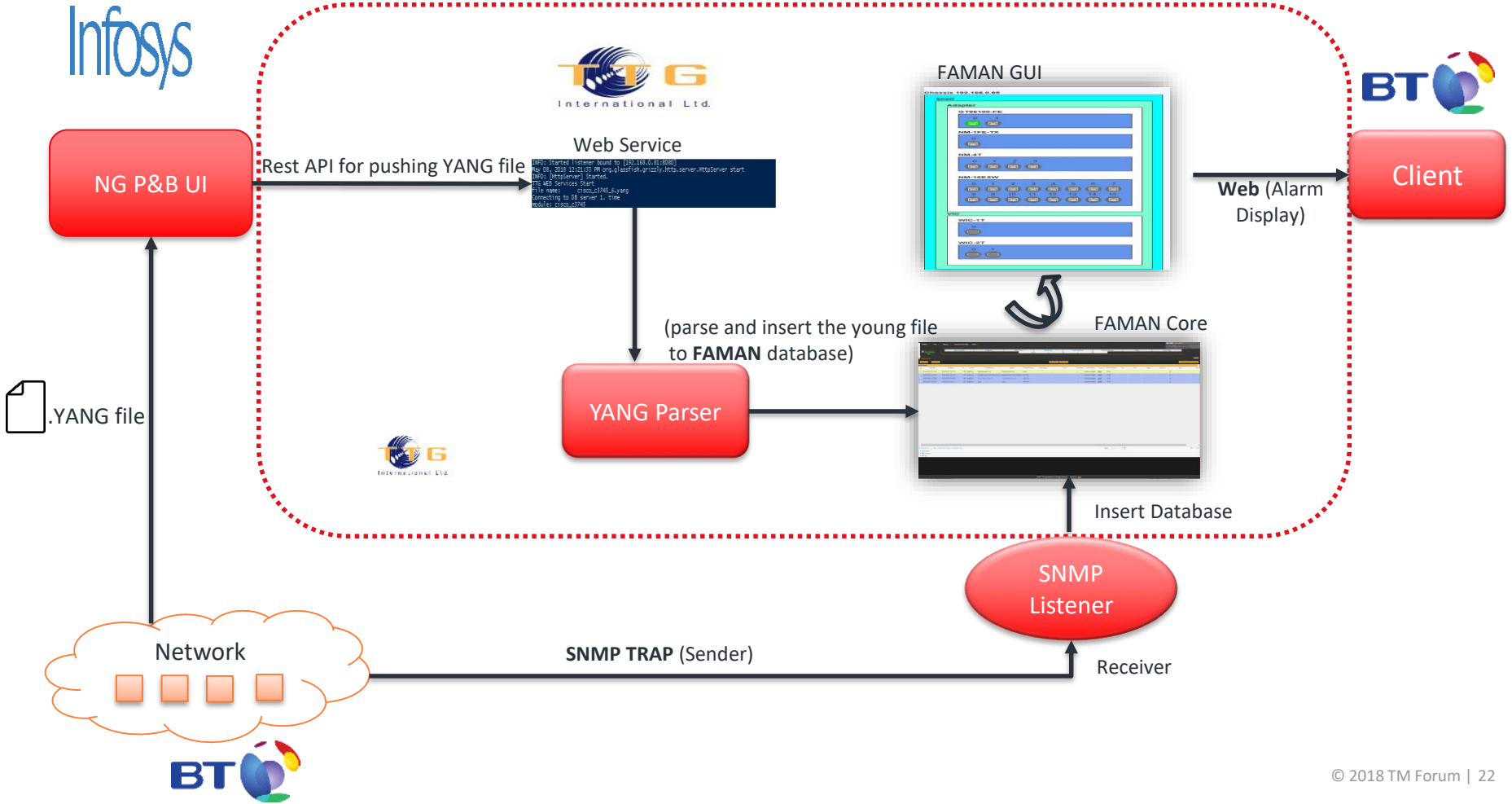
# NG P&B Technical solution



# OSS Inventory



# TTGI OSS Technical Solution



# Readiness For Commercial Launch & Next Steps

BT has already kicked off work on the concept of Next Generation Plan and Build Platform with their strategic supplier Infosys leveraging YANG model for physical equipment and create NetOps catalog to reduce the P&B process time and looking to launch first phase by Dec 2018.

POC will be taken into full-fledged project to deliver –

- Equipment Modeling, meta-data creation in OSS systems (Use cases – 1a, 1b, 1c) – covered in slide number 12 leveraging YANG for device metamodeling
- Equipment Life Cycle creation/management – considering TOSCA to define and implement equipment interfaces
- Infrastructure service creation - considering TOSCA to handle Infrastructure service topology creation

NG P&B solution will finally integrate to Next Generation inventory management system, a BT OSS program in progress to simplify and aggregate the operations support systems (OSS) Inventory management stack for better visibility into systems and data, faster time-to-market, and agility to implement next-generation network technologies.

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Thank You