

# Juniper Automation Awareness Anuta ATOM Bootcamp (Day-3)

Sumit Shukla

Sr. TME

Asha Annapureddy

Sr. Software Engineer



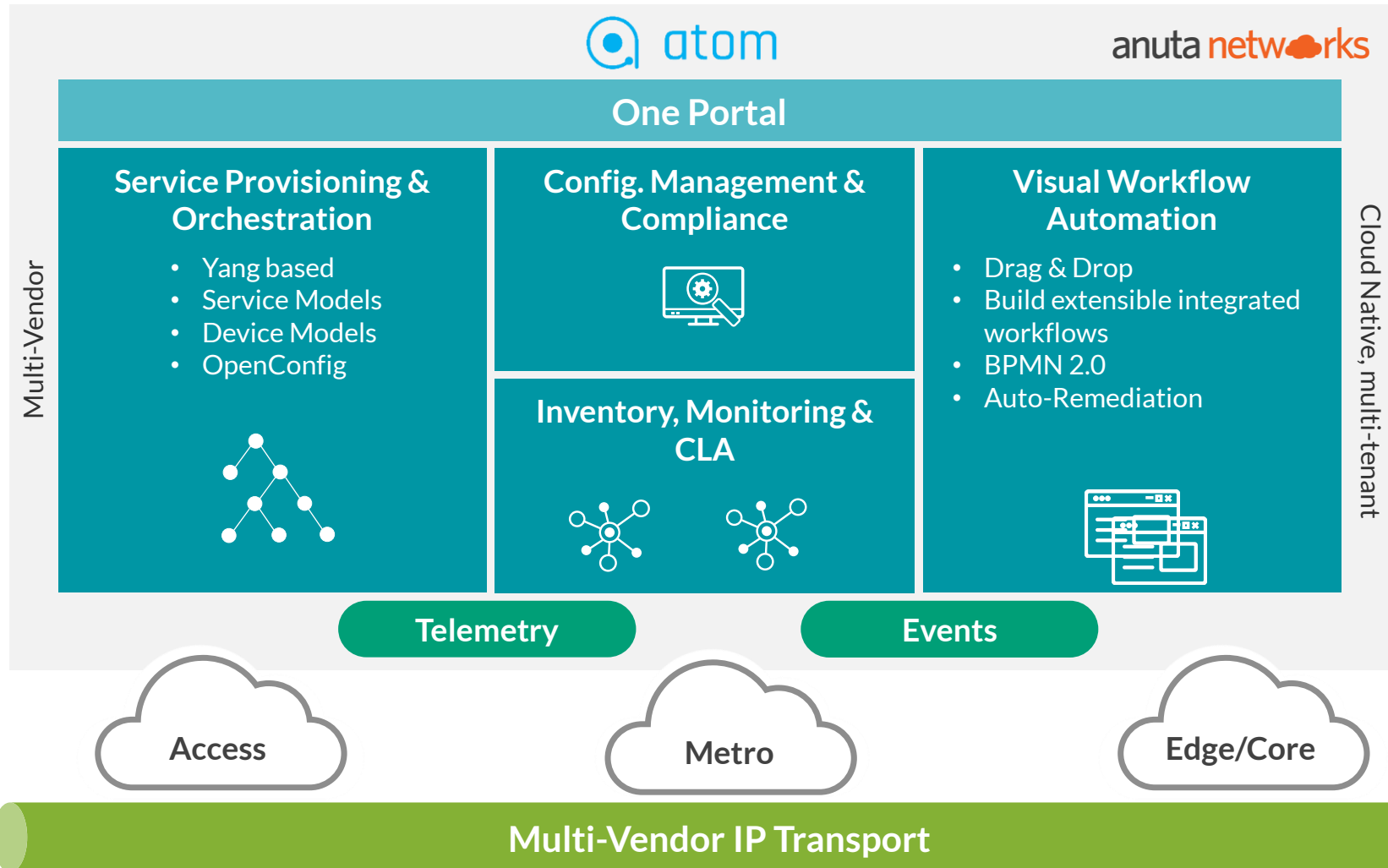
# AGENDA

---

- Day – 1: Compliance Management
- Day – 2: Workflow Hands-On
- Day – 3: Service Model Hands-On
- Why Service Orchestration
- Hands-On Lab for Service Model Execution
- YANG fundamentals
- Building Packages using ATOM SDK
- Day – 4: CLA, Scale, Licensing, Administration.

# Anuta ATOM

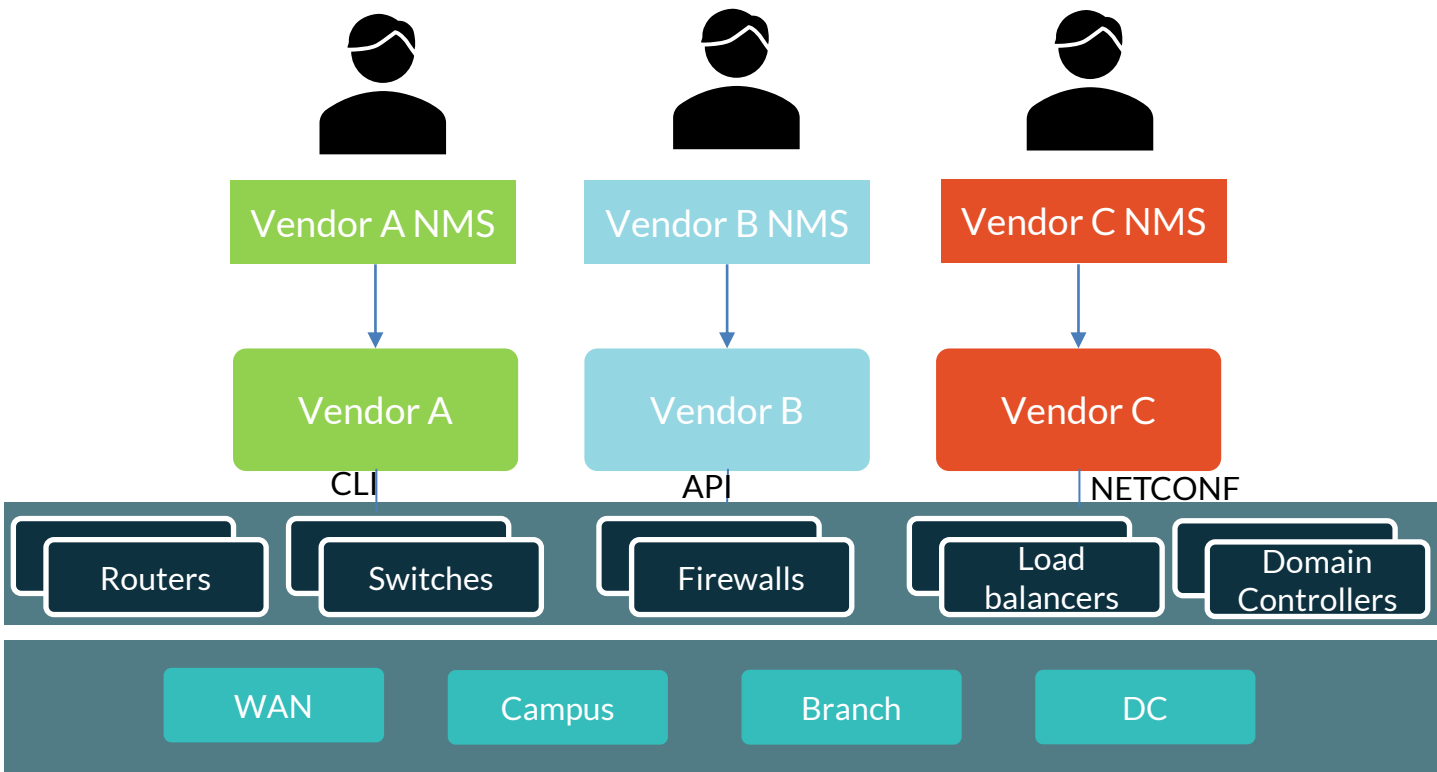
## Service orchestration, Workflow and Compliance with Closed loop Automation



- 3<sup>rd</sup> Party Resale agreement
- On Juniper pricelist
- JTAC
- Juniper Pro services

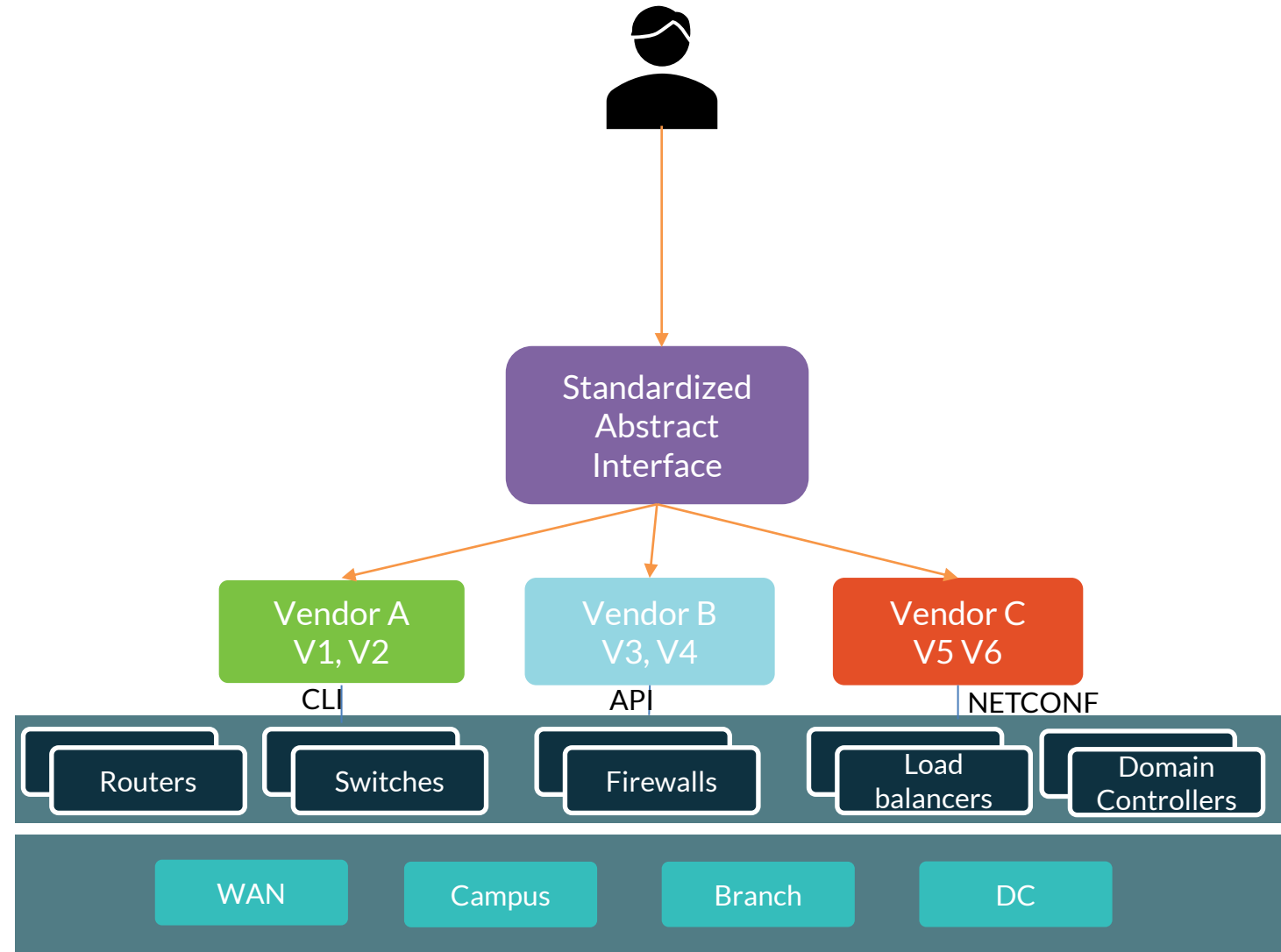
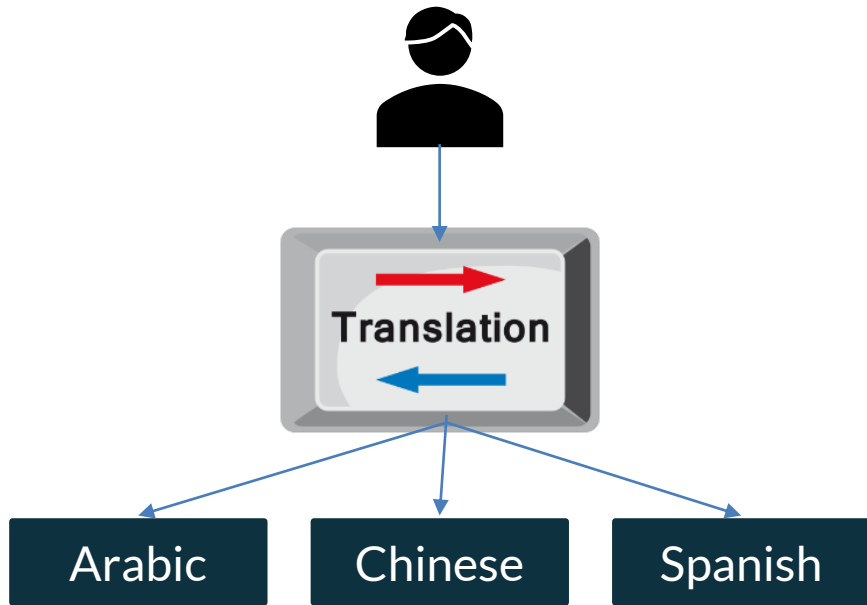
# Service Orchestration with Anuta ATOM

# Service Provisioning - Today's reality



- ✓ One NMS for One Vendor
- ✓ Multi-Skilled Staff requirements
- ✓ Complex configurations to master
- ✓ Multiple touch points for service provisioning
- ✓ Siloed NMS solutions support legacy platforms

# Why Service Orchestration ?



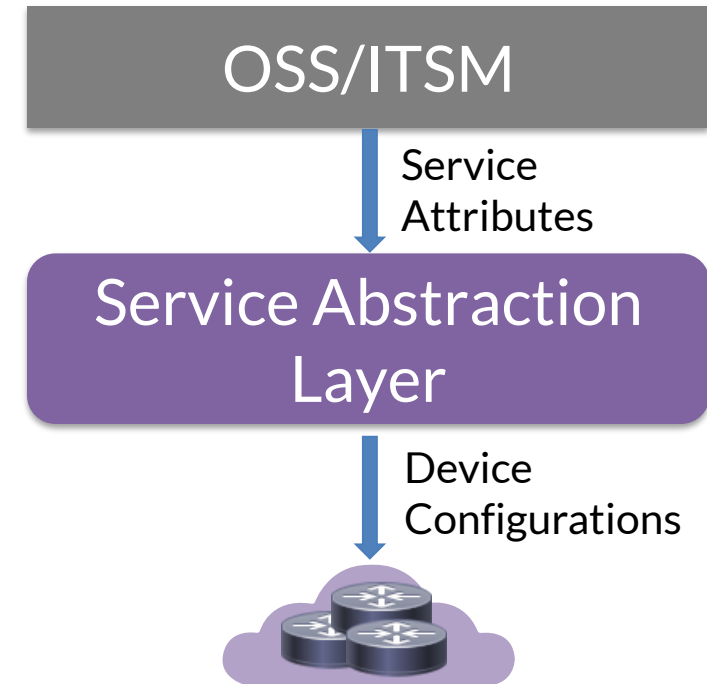
# Service Models delivers Abstraction



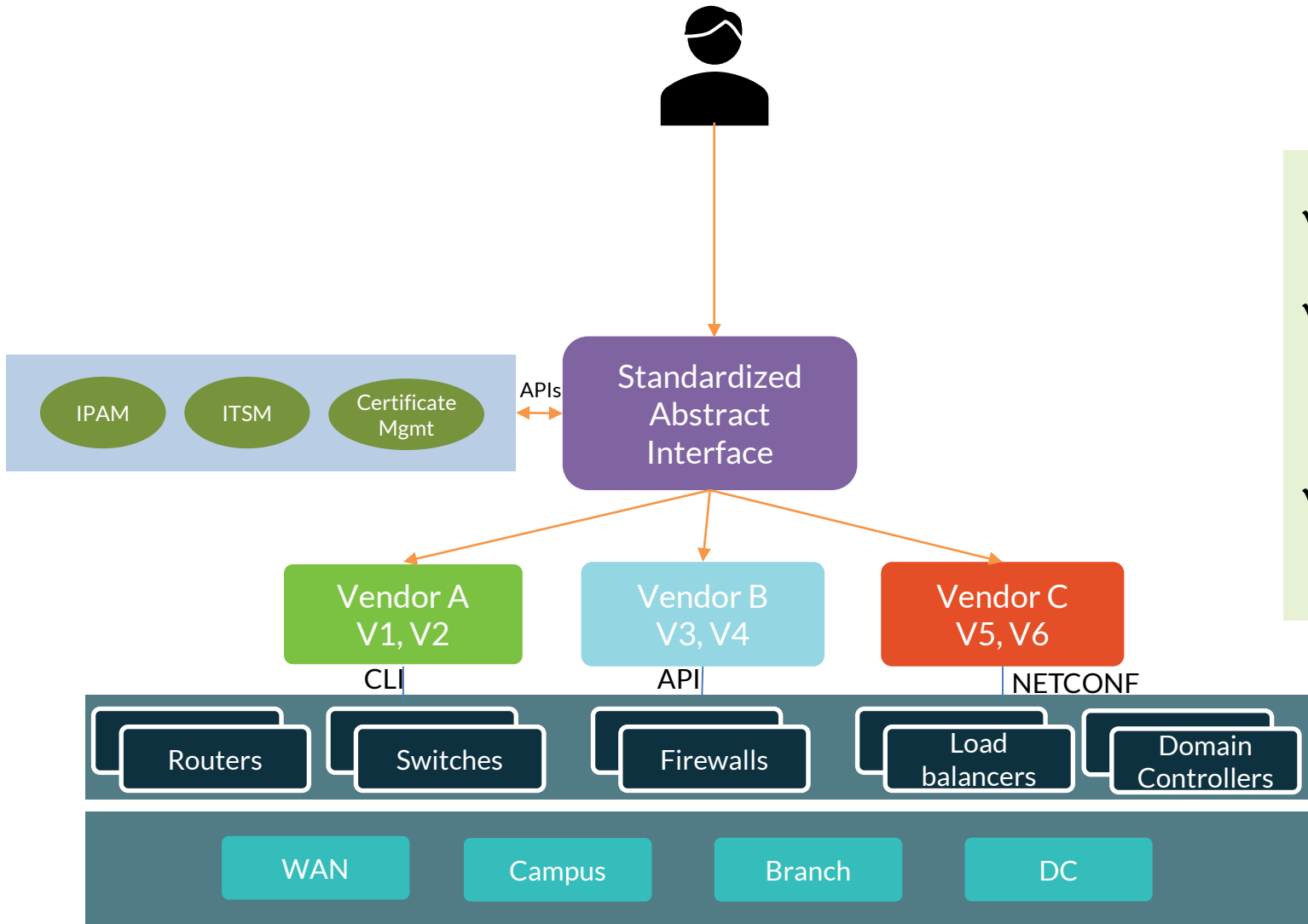
**Service Model** is an abstract specification of the attributes required to instantiate a service type such as L2-VPN, L3-VPN etc. A Service Model may span across multiple devices to realize a service chain.

## L2VPN Configuration snippet

```
set routing-instances ACME instance-type l2vpn
set routing-instances ACME route-distinguisher 11.1.1.1:1010
set routing-instances ACME vrf-target target:13.1.1.1:1010
set routing-instances ACME instance-type l2vpn
set routing-instances ACME interface ae1.456
set routing-instances ACME route-distinguisher 11.1.1.1:1010
set routing-instances ACME vrf-target target:13.1.1.1:1010
set routing-instances ACME protocols l2vpn encapsulation-type ethernet-vlan
set routing-instances ACME protocols l2vpn no-control-word
set routing-instances ACME protocols l2vpn site site3 site-identifier 3
set routing-instances ACME protocols l2vpn site site3 interface ae1.456 remote-site-id 4
set interfaces ae1 unit 456 encapsulation vlan-ccc
set interfaces ae1 unit 456 vlan-tags outer 456
set interfaces ae1 unit 456 vlan-tags inner 457
set routing-instances ACME interface ae1.456
set routing-instances ACME protocols l2vpn site site3 interface ae1.456 remote-site-id 4
```



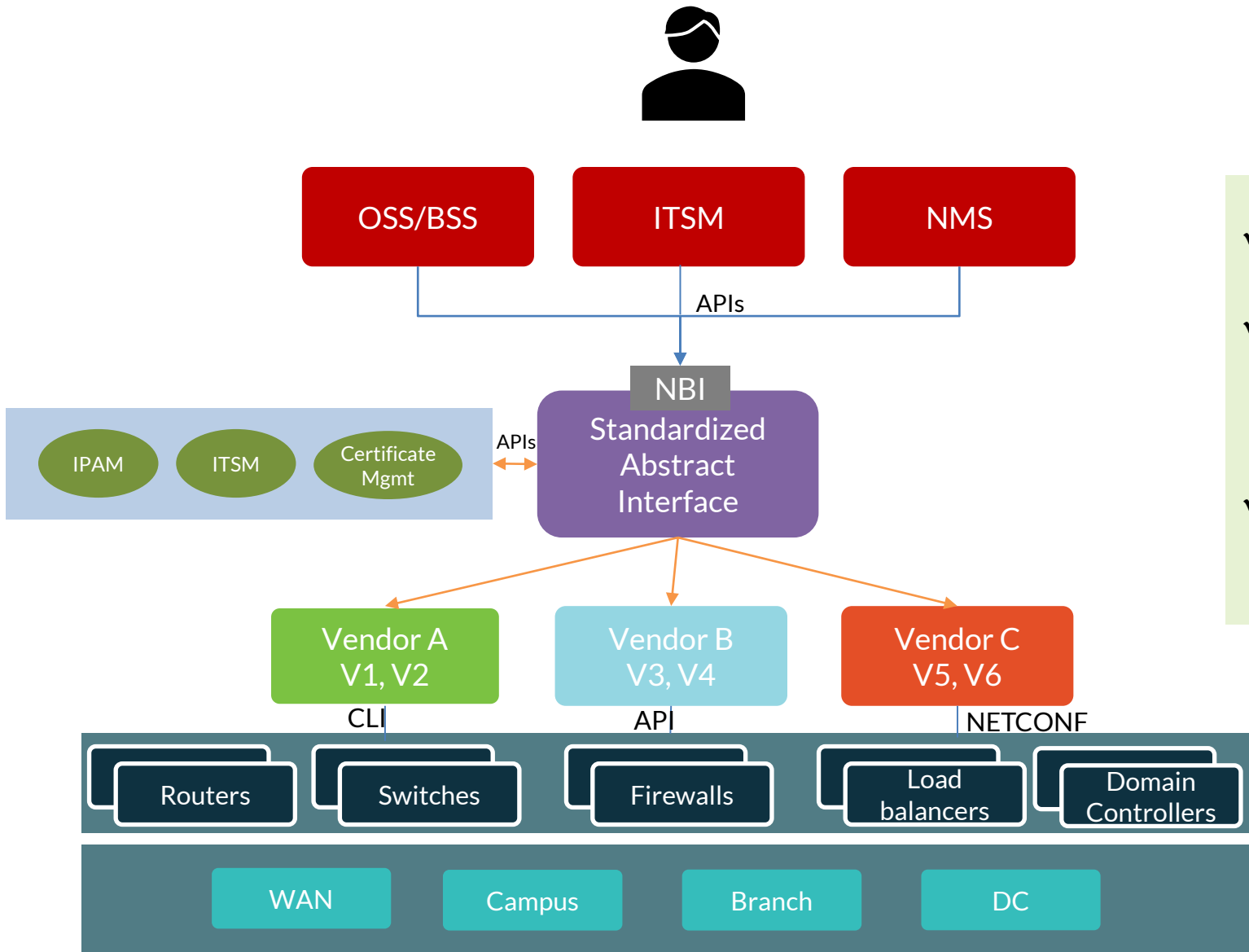
# Integration Requirements



- ✓ Integration into IPAM such as Infoblox
- ✓ Integration into ITSM such as ServiceNow for Ticketing & Approvals
- ✓ Integration into Certificate Management Systems



# Growing complexity



- ✓ Integration into OSS/BSS systems
- ✓ Integration into ITSM tools for service ordering
- ✓ Integration into NMS solutions and other CMDBs

# Other Operator Challenges in Provisioning Services



Deal with stale configurations in the network



Frequent CRUD & lack of compliance



No means to ensure configuration sanity



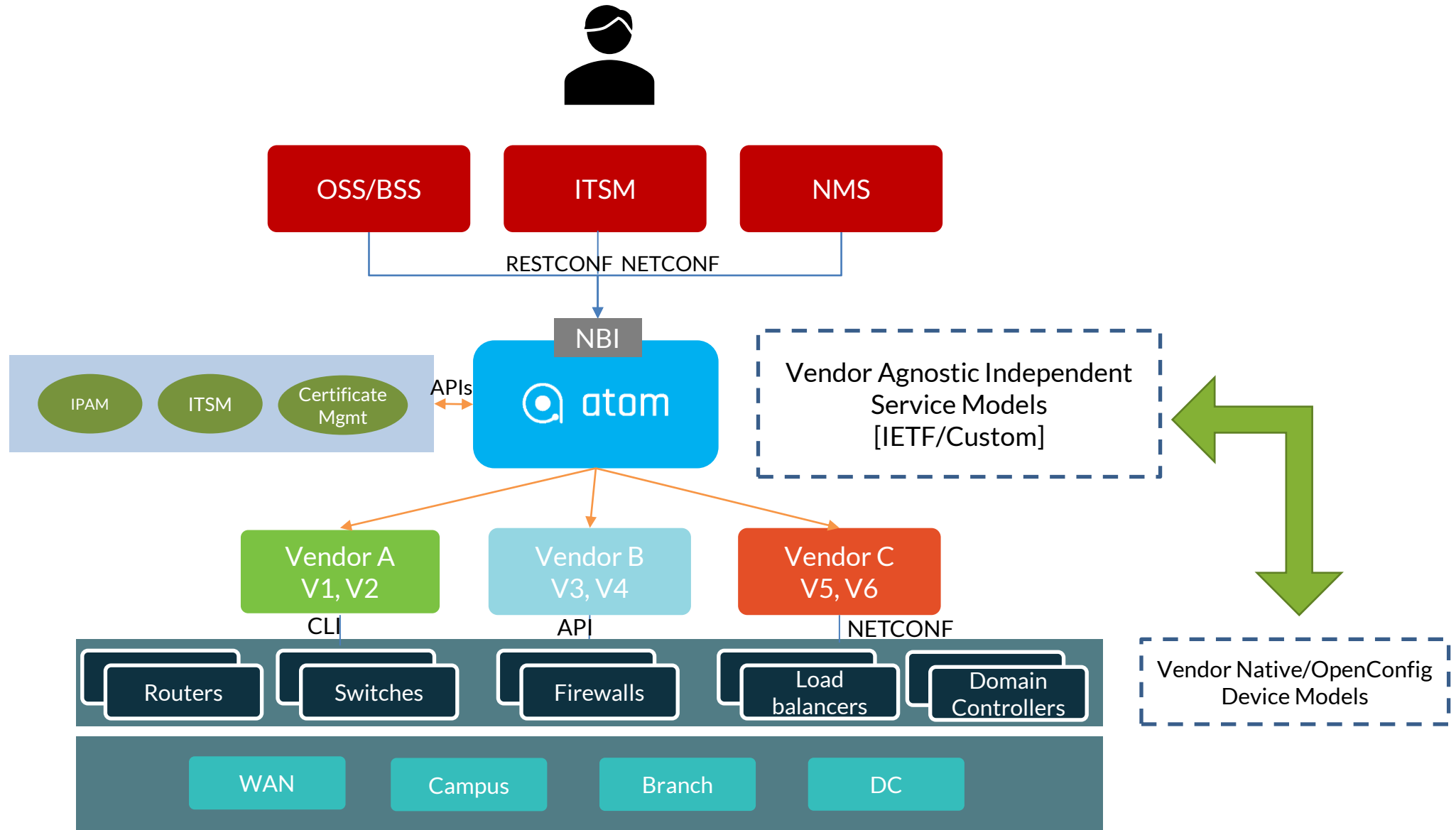
No service or network wide provisioning, only device level



No focus on Usability aspects



# Service Orchestration in Anuta ATOM



# How ATOM takes on the Operator Challenges

**3** CRUD operations with minimal state changes  
Maintains Network & Device State

**2** Atomicity, Consistency, Independent  
Handles stale configuration

**1** Network wide transaction support  
Increase network service visibility

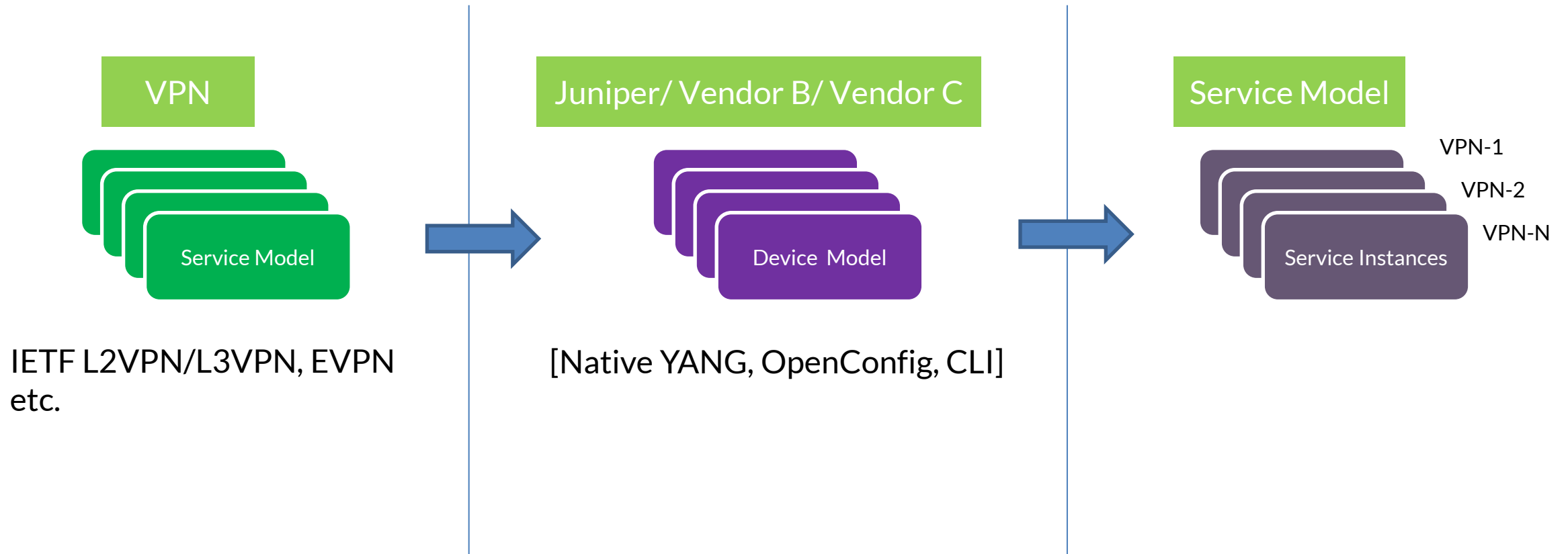


**4** Service Compliance to ensure Service sanity  
Backup, Restore, Rollback,

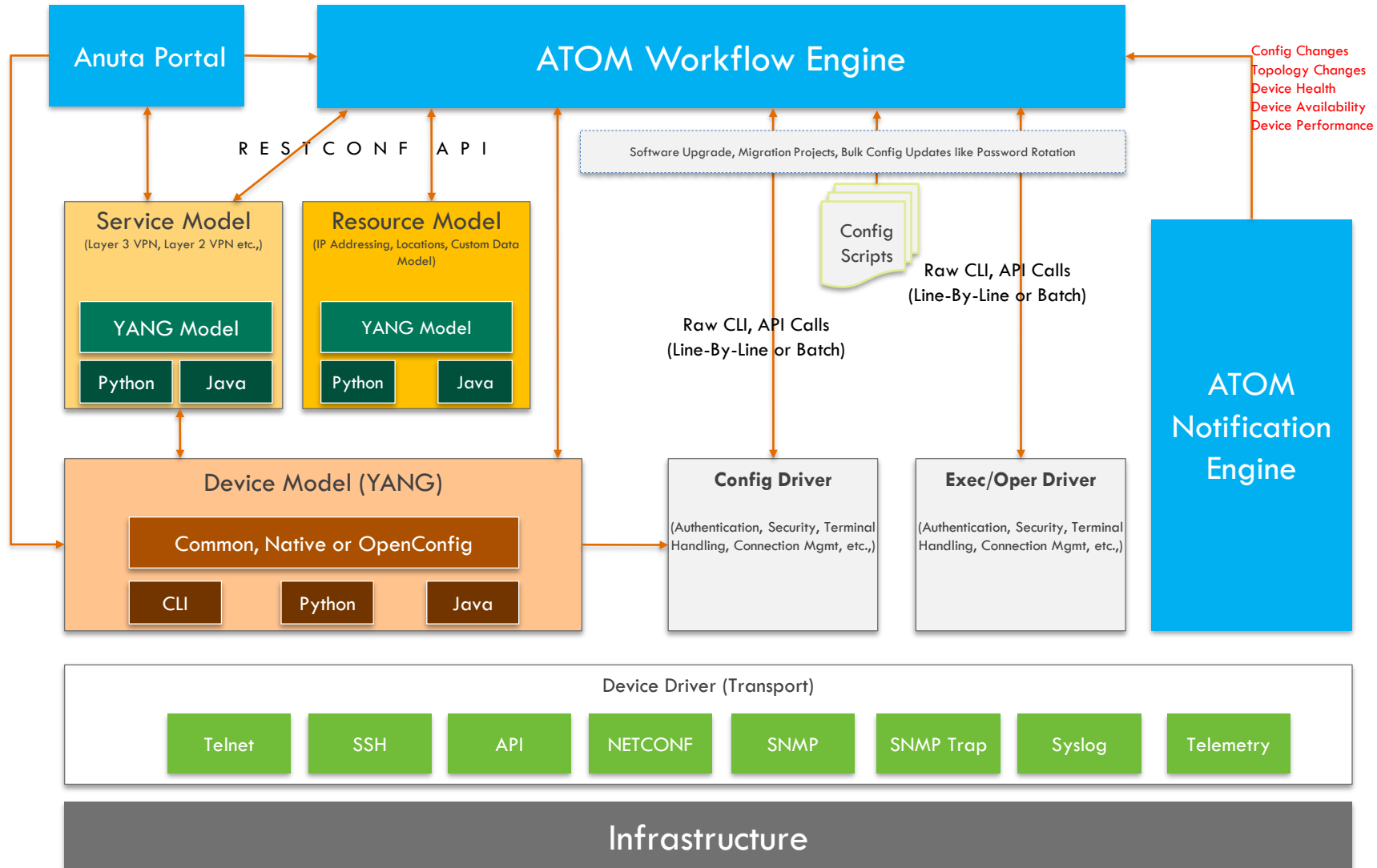
**5** Ease of Use, Dry run modes & Approvals  
Reduce touch points

# Where do we use Service Models ?

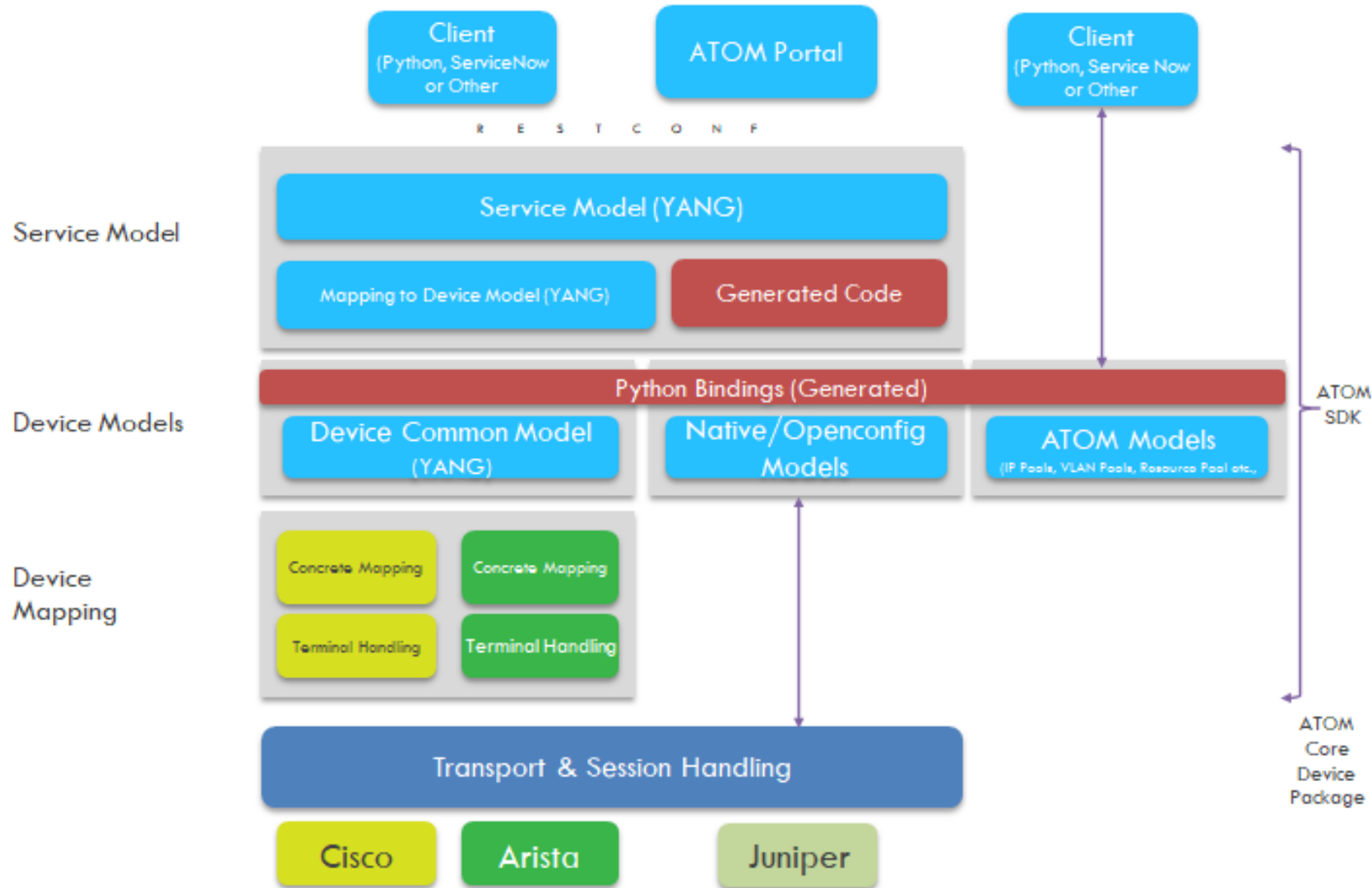
Stateful Services that need Incremental Updates - L2/L3VPN, EVPN, L2/L3 Services etc.



# Network Automation – Model Driven & BPMN 2.0 Workflow



# Device & Service & ATOM Models

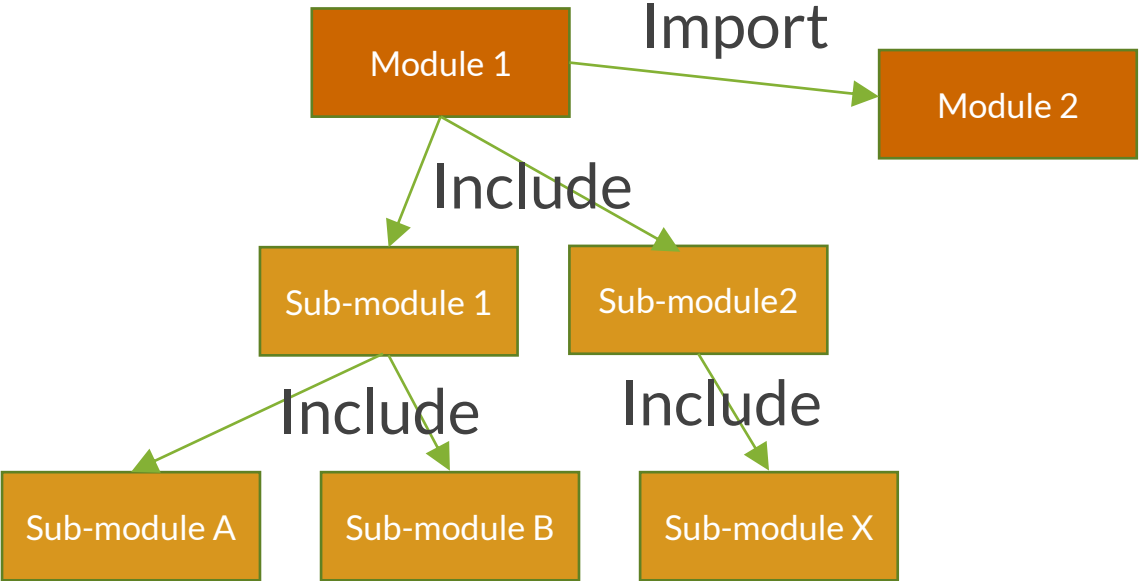


# YANG Data Modeling Language

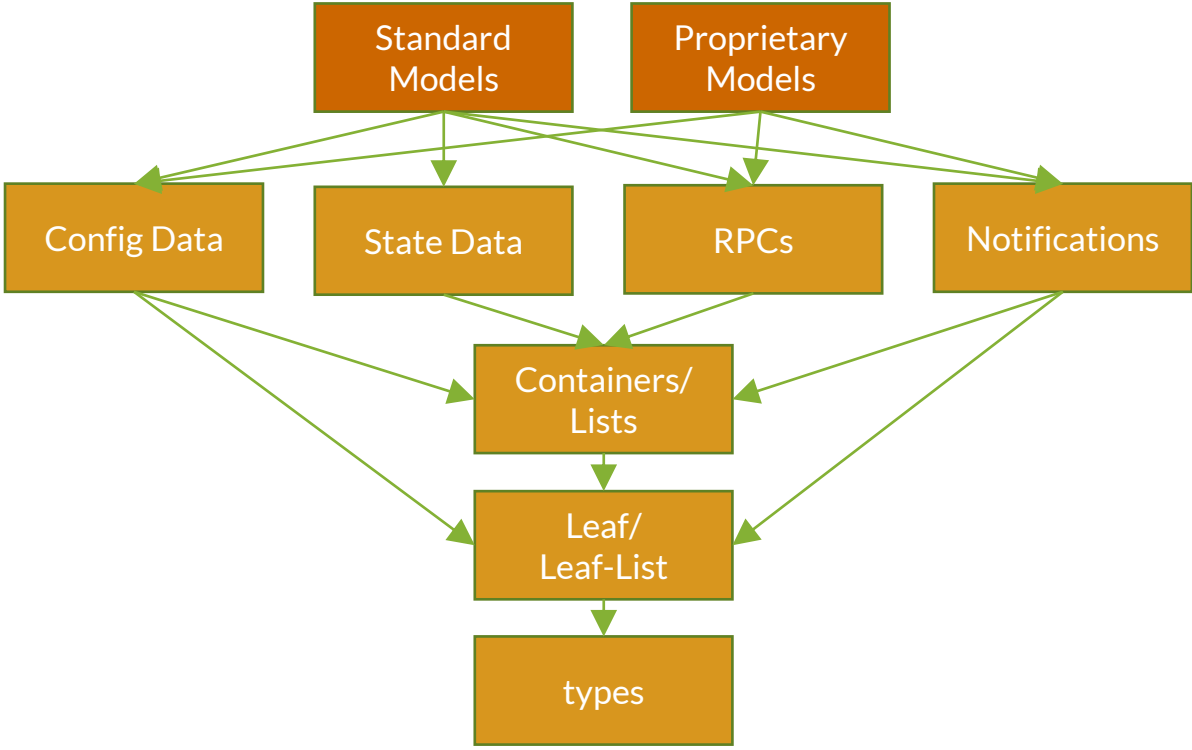
- YANG - data modeling language to model
  - Config data
  - State data
  - RPCs
  - Notifications
- IETF Standard RFC 6020



# Yang Concepts



# Yang Concepts



# YANG Example

```
module acme-system {
  namespace "http://acme.example.com/system";
  prefix "acme";

  organization "ACME Inc.";
  contact "joe@acme.example.com";
  description "The module for the ACME system.";

  revision 2007-11-05 {
    description "Initial revision.";
  }

  container system {
    leaf host-name {
      type string;
      description "Hostname for this system";
    }

    leaf-list domain-search {
      type string;
      description "List of domain names to search";
    }

    list interface {
      key "name";
      description "List of interfaces in the system";
      leaf name {
        type string;
      }
      leaf type {
        type string;
      }
      leaf mtu {
        type int32;
      }
    }
  }
}
```

```
module: l2edge_training
+--rw l2-edge
  +--rw name? string
  +--rw device* [device-id]
    +--rw device-id -> /ac:devices/device/id
    +--rw variant? enumeration
    +--rw interface-name string
    +--rw vlans
      +--rw vlan-id* int16
```

```
module l2edge_training {
  yang-version 1.1;
  namespace "http://anutanetworks.net/l2edge_training";
  prefix l2edge;

  import controller { prefix ac;}

  description "This module provides the l2-edge service";
  revision 2018-06-19 {
    description "Initial revision.";
  }

  container l2-edge {
    leaf name {
      description "Name of the l2-edge service";
      type string;
    }

    list device {
      key device-id;
      leaf device-id {
        type leafref {
          path "/ac:devices/ac:device/ac:id";
        }
      }
      leaf variant {
        type enumeration {
          enum "trunk";
          enum "access";
        }
        default "trunk";
      }
      leaf interface-name {
        description "Interface for the l2-edge service";
        type string;
        mandatory true;
      }
      container vlans {
        leaf-list vlan-id {
          type int16 {
            range 2..4094;
          }
          min-elements 1;
        }
      }
    }
  }
}
```

The background features a night cityscape with numerous skyscrapers and lights. A semi-transparent green rectangular area is overlaid on the center of the image. Within this green area, there is a network diagram consisting of vertical lines of varying heights, each topped with a small white circle, resembling a signal or data transmission structure. The text 'Thank you' is centered in white, with a thin white horizontal line underneath it. Below the line, the Juniper Networks logo and tagline are displayed in white.

# Thank you

JUNIPER NETWORKS | Engineering  
Simplicity