## Reactive Networks

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# DIGITIZATION: THE NEXT WAVE OF SERVICE PROVIDER TRANSFORMATION AND INNOVATION





### **New Things Connected**

- SP Networks
- Mobile device and apps
- · Sensors and wearables
- Cell towers
- Homes



### New Data Flows

- Personalized customer data
- Network data
- Sensor data



#### Process Innovation

- Network transformation
- Customer management
- Field operations optimization from remote cell tower monitoring
- Fraud prevention
- Solution integration



- Improved end-user experience
- Scalability of network operation teams
- Improved performance of sales and marketing teams

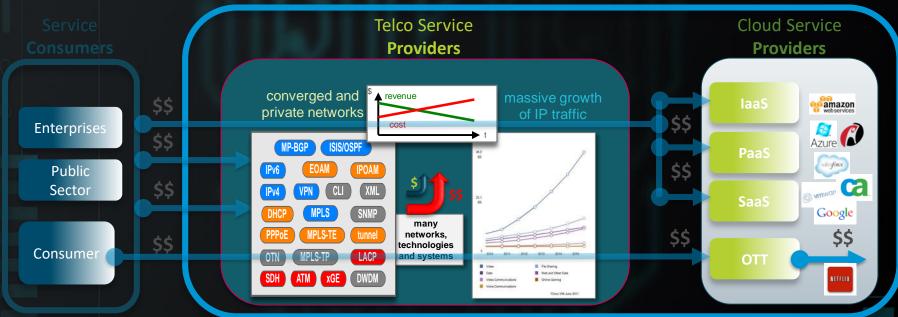
\$2T in Digitization and IoT Value-at-Stake for Service Providers (2015–2024)

Source: Cisco Consulting, 2016



### THE STATE OF AFFAIRS

#### The Internet



- 1. Consumerization of usage
- 2. Pay-as-you-go

- 1. Complex systems inherited from decades of network and service evolution
- 2. Exponential growth of bandwidth to manage
- 1. Lean & Agile players with economies of scale
- 2. Highly-automated operations
- 3. Fast-paced innovation



### **OLD MODEL: SILOED**



Mobile infra

Video infra

DC

DC



Enterprise infra

DC

DC

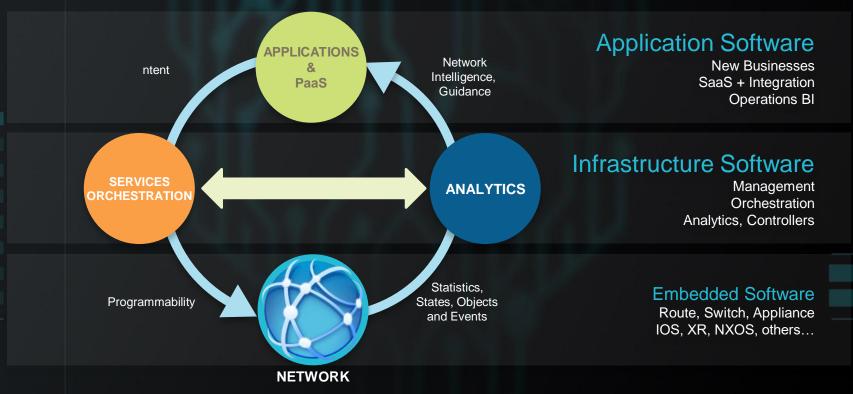


DC DC



### SDN == REACTIVE NETWORKING

Turning data into information to drive intent



### THE FULL STACK



APPLICATIONS & PaaS

#### Applications to enable Business Outcomes

A set of business outcomes that can be presented to users via a portal that exposes the services to be consumed as defined by the operator along with the tools for the operator to effectively manage the system.

**ANALYTICS** 

#### **Data Analytics Platform**

Provides a framework to collect all of the metrics, statistics, counters, log and events data from the entire software and hardware platform that can be used by a set of analytic modules to turn the data into actionable information that applications can use to make informed requests of the infrastructure.

SERVICES ORCHESTRATION

#### **Orchestration Platform**

Harnessing a complete set of SDN components to provide a model driven framework that applications can use to program their intent into the compute, network and storage infrastructure to realize the business outcomes.



#### **Network Platform**

Creating the scalable foundation for services across Edge, WAN and Data Center





ERVICES ESTRATION

**Programmability** 



Network Intelligence, Guidance

**ANALYTICS** 



States, Objects and Events

Statistics,

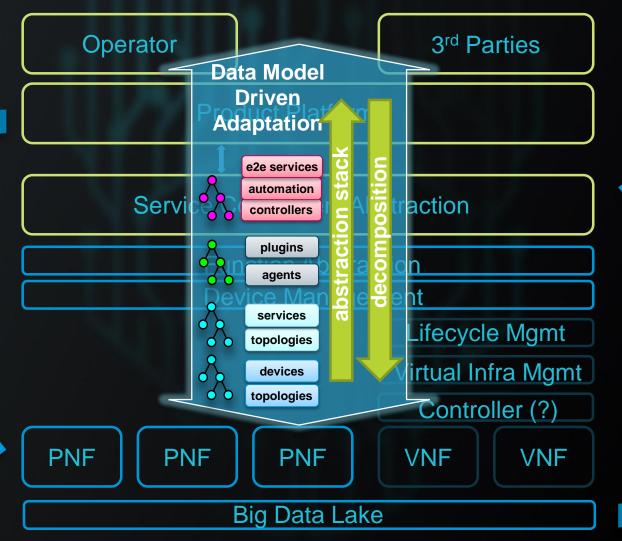
**NETWORK** 

#### Services Orchestration Platform

Incorporating the model and policy driven orchestration capabilities of the Cisco/Tail-f solution along with the SDN controller functionality provided by ODL. This platform provides a complete network services life-cycle manager combined with a VNF life cycle manager that can implement both simple and complex service topologies that span the network and data center domains.

### REFERENCE MODEL





### A SERVICES MARKETPLACE





Developers (internal and external) can use Platform SDK to create new use cases/service definitions



Network Orchestration Platform
Presenting infra use cases sold aaS

**Network As A Service Platform** 





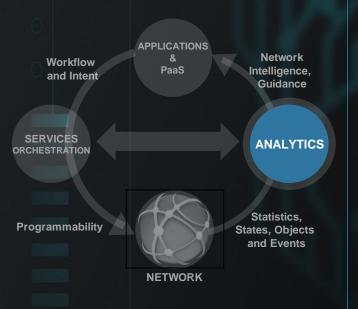




Physical and virtual infrastructure

Infrastructure





#### Analytics

A set of tools and APIs that can be used by application developers to gain access to real-time state of the network, data center, services & infrastructure so they can make informed requests of the network to implement their policy and intent.

### **ASSURANCE & ANALYTICS COMPONENTS**



Collect statistics, metrics, logs traps, events from the infrastructure, the orchestration system and the VNFs

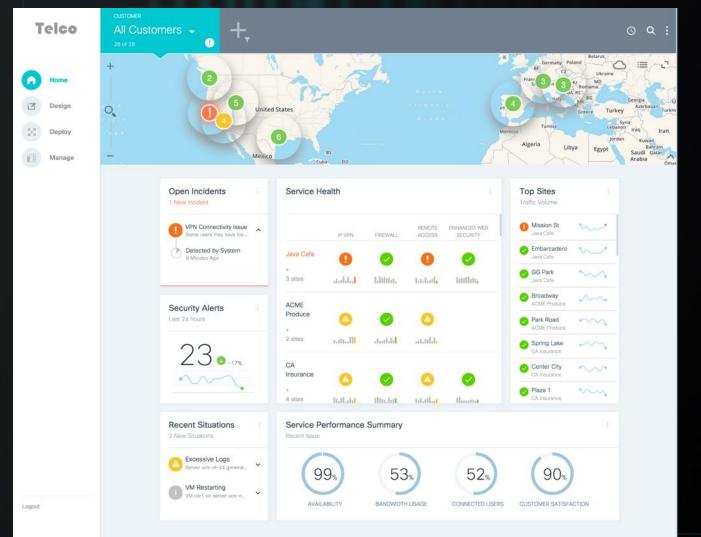
Decouple data aggregation (publishers) from data analysis (consumers) – allow any OSS app the potential to access any data source Analytics Portal (Operator) (AnX)

Service Assurance (SME)

Data Platform
(PaNDA)

Operator View into the services that maps from service view to infrastructure view

### ADVANCED NETWORK ANALYTICS

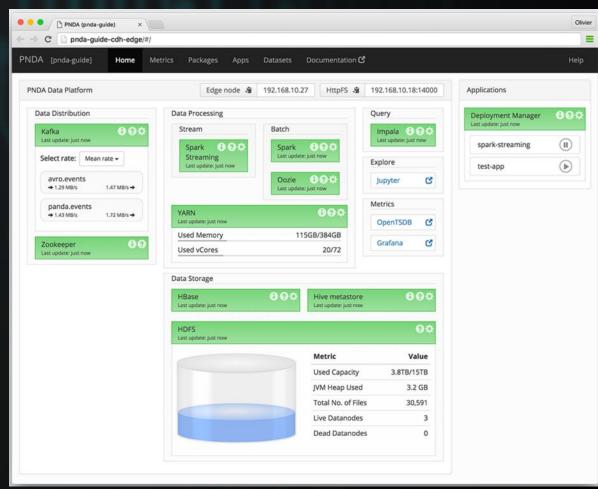




### PLATFORM FOR DATA ANALYTICS



- Opensource Platform
- Composed of a set of Opensource tools
- Pre-packaged, Mid-stream Opensource Project
- CloudScale
- Big Data Architecture
- Can be leveraged for many types of applications/environments (Media, Consumer, Enterprise, Analytics, etc)





Workflow and Intent

APPLICATIONS

Network Intelligence, Guidance

**USE CASES** 

SERVICES ORCHESTRATION

**ANALYTICS** 

Programmability



Statistics, States, Objects and Events

**NETWORK** 

### GENERALIZED USE CASE



