


netFLEX<sup>®</sup>

**Simplify**  
**Standardize**  
**Personalize**

*realize true network flexibility*



“When you can make the disparity of the underlying network look the same to operations personnel and connected systems, you have achieved business scale. netFLEX helped us achieve this simplification for our Global Transport Network.”

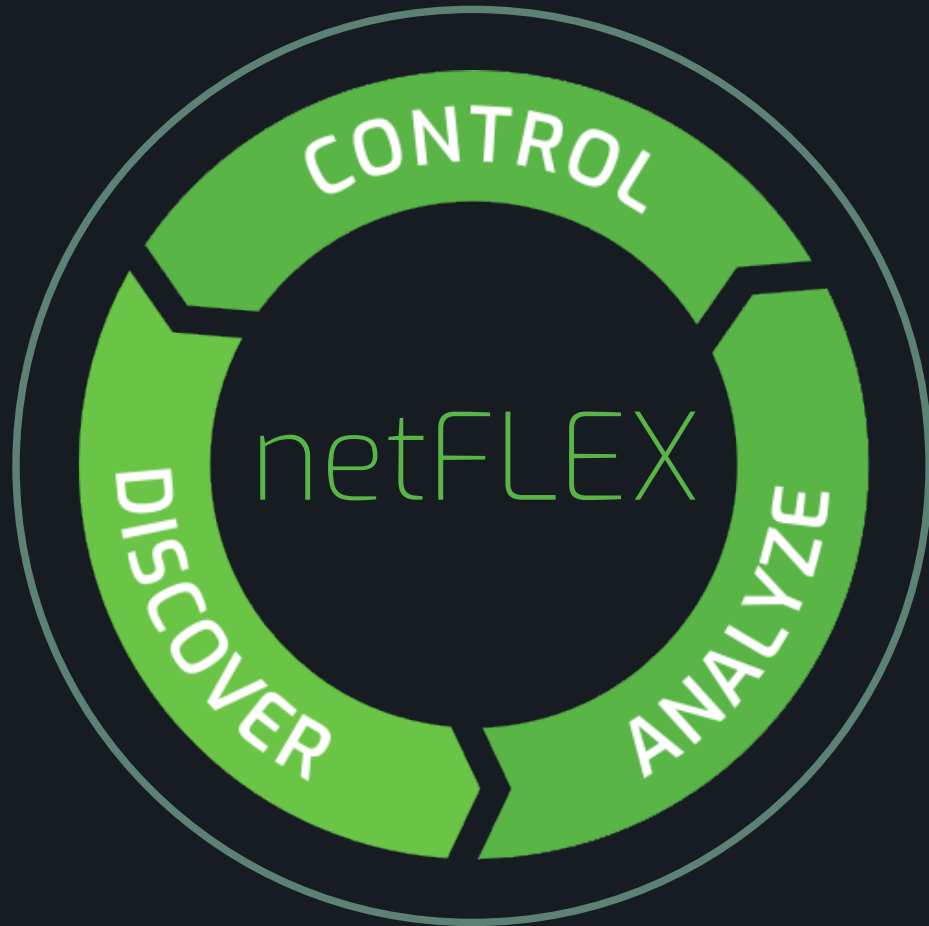
- Tier 1 Service Provider Sr Exec



## Industry Challenges

What got us here, will not get us to the 'strategic next.' Multi-Vendor, Multi-Technology, Multi-Generation, vast M&A, Network Disagg and broader... requires an approach to evolve with the Network.

- 1 Significant transport complexity
- 2 Inventory is never up-to-date
- 3 Reactive service assurance
- 4 Human dependency is error prone
- 5 Customer self-serve must be the outcome



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## The Solution

Comprehensive network automation. The only solution capable of bringing your transport network elements together for uniformity of management.

- 1 Supports multi-vendor, multi-generational technology
- 2 Dynamic network discovery so that the network itself is the source of truth
- 3 Analytics-driven service assurance to keep your network running smoothly
- 4 Automation to reduce costs enabled through standard APIs for integration
- 5 Programmability to enable a customer defined experience

netFLEX

## Discover Realtime Inventory (DRI)

### The Inventory Opportunity

An operator's network inventory is never up-to-date. With inventory being the foundation of the operation, every business function is impacted if it is wrong.

The more complex the network becomes through years of growth, M&A, multi-vendor and multi-technology... the bigger the impact.

### Our Solution

DRI provides realtime access to the actual physical and logical network to deliver the inventory that you make decisions from.

We create the most accurate transport inventory across the most suppliers, technologies, overall network elements, for multiple generations. This inventory is then leveraged for network planning, design, activation, and assurance – critical to all automation.

## Use Cases & Outcomes



- **Discover your unused network and capacity.** Likely only 70% of your inventory is accurate. Reduce service delivery and assurance functions by 80% or more leveraging the 'truth.'
- **Save time spent manually reconciling** and trying to maintain records while your network is constantly evolving.
- **Industry best practice reflects 3%-5% is 'available'** as network and capacity that is already in place to reuse and grow - which means potentially tens of millions in savings.

Based on industry averages and accepted best practices.

netFLEX

**Discover  
Analyze &  
Assure  
(DAA)**

## The Service Assurance Opportunity

Most network operator's approach to service assurance is to **wait for the network to break** or **wait for the customer to call**.

The biggest impact to Customer Experience is the availability and uptime of their network. Most operators are *eyes on glass*, waiting for something to break, and leverage *are you there* based network management.

## Our Solution

**DAA** collects all vital health and performance data from the network to automatically detect, predict, and resolve issues.

The ability to correlate all realtime and historical performance data with the actual inventory, allows for **industry leading service assurance automation within the transport domain**. We make the data *actionable*, so you can *stop waiting*.

## Use Cases & Outcomes



- **Inside a Minute** to determine service path, gather data, and isolate the transport issue, by reducing swivel-chair.
- **Reduce SLA payouts** by fixing it, before it breaks, which can mean millions saved.
- **Save hours** with the most accurate information for your technicians.
- **Revolutionize** the Customer Experience

Based on industry averages and accepted best practices.

netFLEX

## Optical Domain Control (ODC)

### The Service Delivery Opportunity

Network operations activity to engineer, design, and activate or change a service has never been more problematic. As operators support generations of diverse transport technologies and suppliers, to now include disaggregation of the network, a reliance on humans to support this at scale, with quality, is impossible.

### Our Solution

ODC leverages realtime inventory as the source-of-truth to know where network and capacity exists. The realtime service-path is auto-designed, and auto-provisioned, allowing for *human hands to be off the network*.


**Service Delivery transformation** as work functions *all look the same* across the most diverse set of suppliers and technologies within the transport industry. Further, Digital Transformation and customer Self Serve is enabled to Portal, Mobile, and API-driven options to a customer.

### Use Cases & Outcomes



- **Near instantaneous delivery** of design and activation leveraging discovered inventory and provisioning automation.
- **Avoid human error** which means near 100% quality leveraging real-time inventory and control.
- **Accelerate New Service Revenue** through customer Self Serve and Optical-VPN

Based on industry averages and accepted best practices.

A photograph of a data center aisle. The aisle is lined with black server racks on both sides. The racks are filled with various electronic components. Above the racks, there are yellow overhead lighting fixtures. The floor is a light-colored, polished surface. In the background, a person is visible sitting at a desk, and a black office chair is also visible. The overall scene is a typical data center environment.

“The ability to see our network end-to-end even with some of the legacy elements we have has been such a time saver and I couldn’t even calculate how much money and time that’s saved us.”

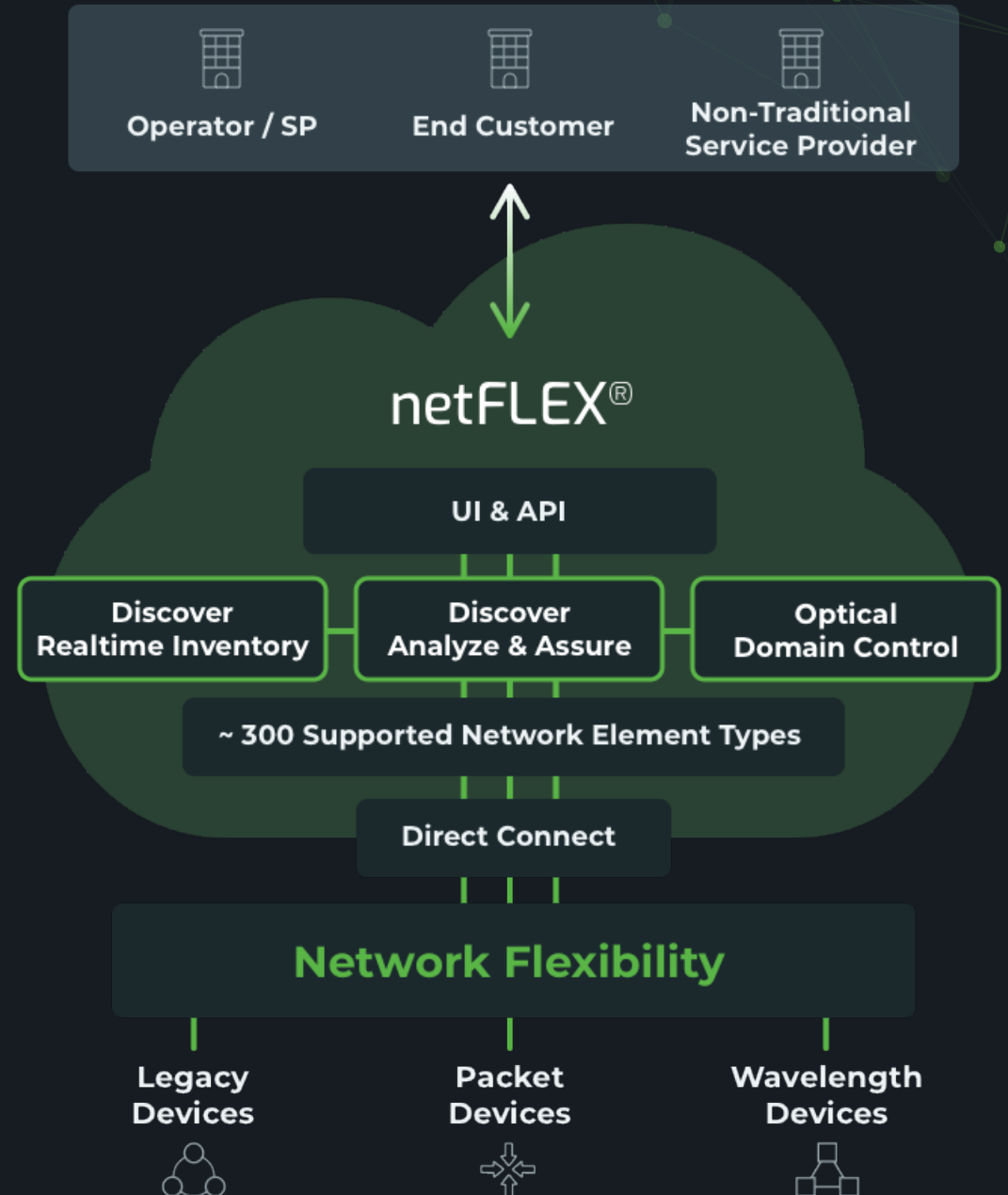
- Data Center Systems Architect



# How It Works

We make it all look the same.

- **UI:** Standardized single-pane-of-glass for Realtime Inventory, Analytics, Assurance & Test Automation, Visualizations (map, chassis, logical, custom-reporting), and so much more.
- **API:** Multi-vendor solution with a standard API framework to consuming apps. Enables simplified integrations for future network evolution.



# What it Does

- Topology & Equipment Discovery
- Card & Port Discovery
- Service / Logical Discovery
- Analytics & Data Driven Programmability
- Circuit Analysis for Automated Test/Triage
- Inventory / Capacity Reporting
- Intent Analysis / Path Computation
- Waves Provisioning & Capacity Management
- Network-as-a-Service API's
- Optical VPN for Customer Self-Serve

And more...



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# Why netFLEX?

- **Only Multi-Vendor Solution at Tier 1 Scale:** Including support for 300+ devices & years of software releases.
- **Programmability:** Visibility & Control across your network. Custom-defined by you.
- **Network Flexibility:** Across every functional area & API support to integrate into your workflow.
- **LightRiver Expertise:** We build & deploy some of the largest and most complex networks in the world.





## What's Next?

CDX, or Customer Defined Experience, is all about getting your network into your hands.

*Any Time, Any Where, Any Device.*

- 1 Expanded API support (external application feeds)
- 2 Elegant *Scoreboard* UI
- 3 Multi-platform mobile enabled
- 4 Personalized to your needs

# Awards 2019

**Recognition.**

**Credibility.**

**Responsibility.**

LightRiver has always been dedicated to being an innovator in the industry.

We are grateful to our staff of professionals and we are honored to be acknowledged for their efforts.



**PTC**  
Innovation  
Awards

Best Network  
Intelligence  
Innovation



SDN/NFV  
Technology  
High Rating Recipient



Global Innovations  
in Assurance



Technology Solutions  
Awards Finalist



Award Winner  
Test and Measurement

netFLEX



**Industry Leader**

Most decorated  
*Optical Domain  
Controller (ODC)*  
in 2019

# Trusted by **Industry Leaders**



## **TRUSTED**

3 of 4 Largest US Wireline Telecom Service Providers



## **SUPPORT**

20+ Vendors, 300+ Devices & 1000's of OS's



## **SCALE**

Millions of Ports & Services Under Management



## **CREDIBILITY**

Support of the Industry's Most Available Transport Networks

# LightRiver



## FACTORY BUILT NETWORK

Engineer & deploy thousands of packet optical nodes annually.



## LIGHTRIVER LABS

Engineering, test, & certification for multi-vendor integration.



## LIFECYCLE ENGINEERING

Commitment to the life of the individual technology platform.



## SUPPLIER RELATIONSHIPS

Deep support and insight into future technologies.

*“LightRiver designs, engineers, and deploys some of the largest and most complex transport networks on the planet. These learnings across the industry’s leading suppliers, access to all the technologies and supplier expertise... all an advantage to netFLEX Development.”*

netFLEX<sup>®</sup>

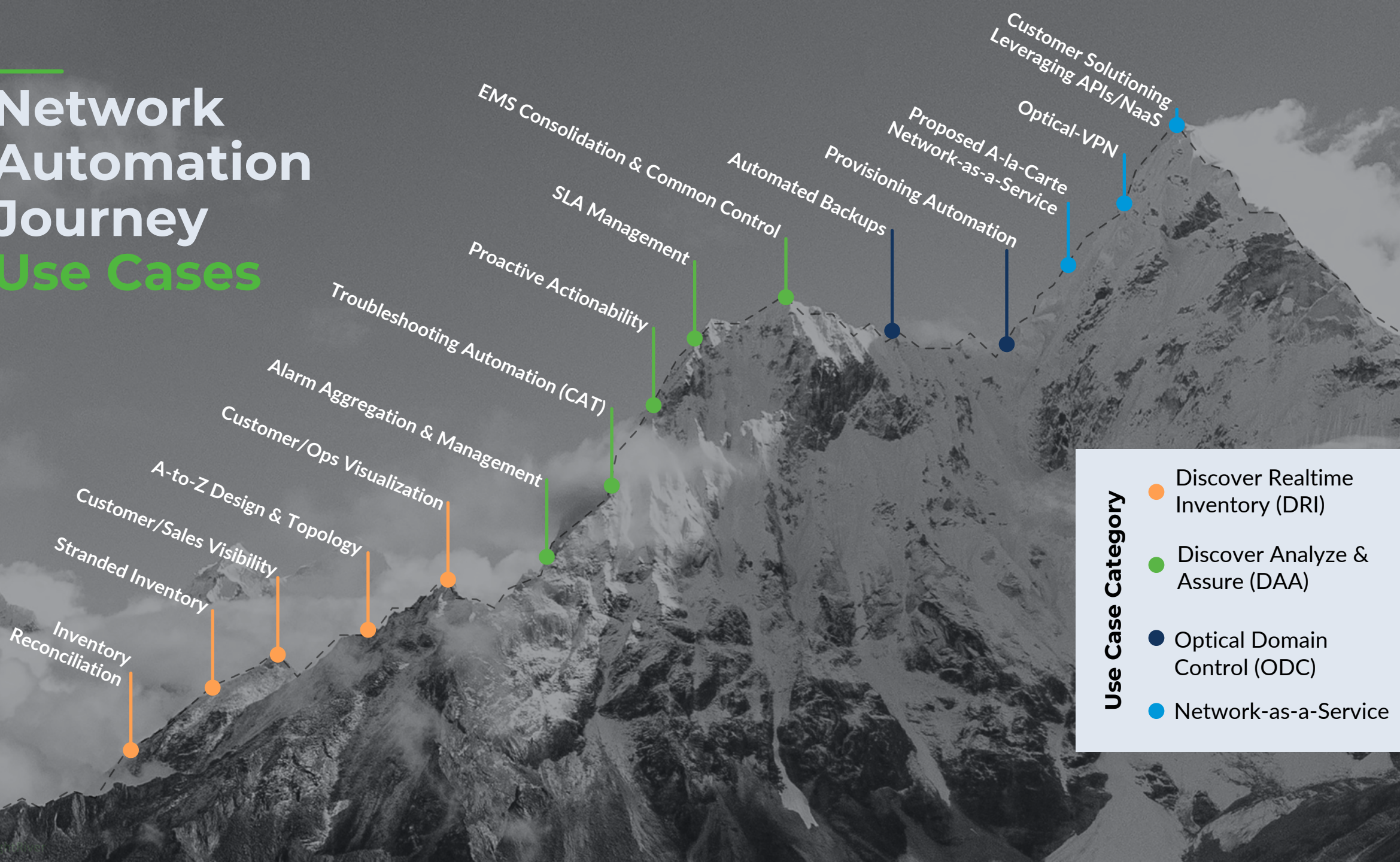
# Appendix

Customer defined experience to  
realize true network flexibility



# Network Automation Journey

## Use Cases



# Swagger Services Inventory

Document, demonstrate, and develop API Services to northbound applications and southbound network infrastructure.

The image displays the Swagger UI for the netFLEX RESTful API. The main interface shows a search bar with 'swagger.json' and an 'Explore' button. Below this, several API service categories are listed, each with a set of endpoints:

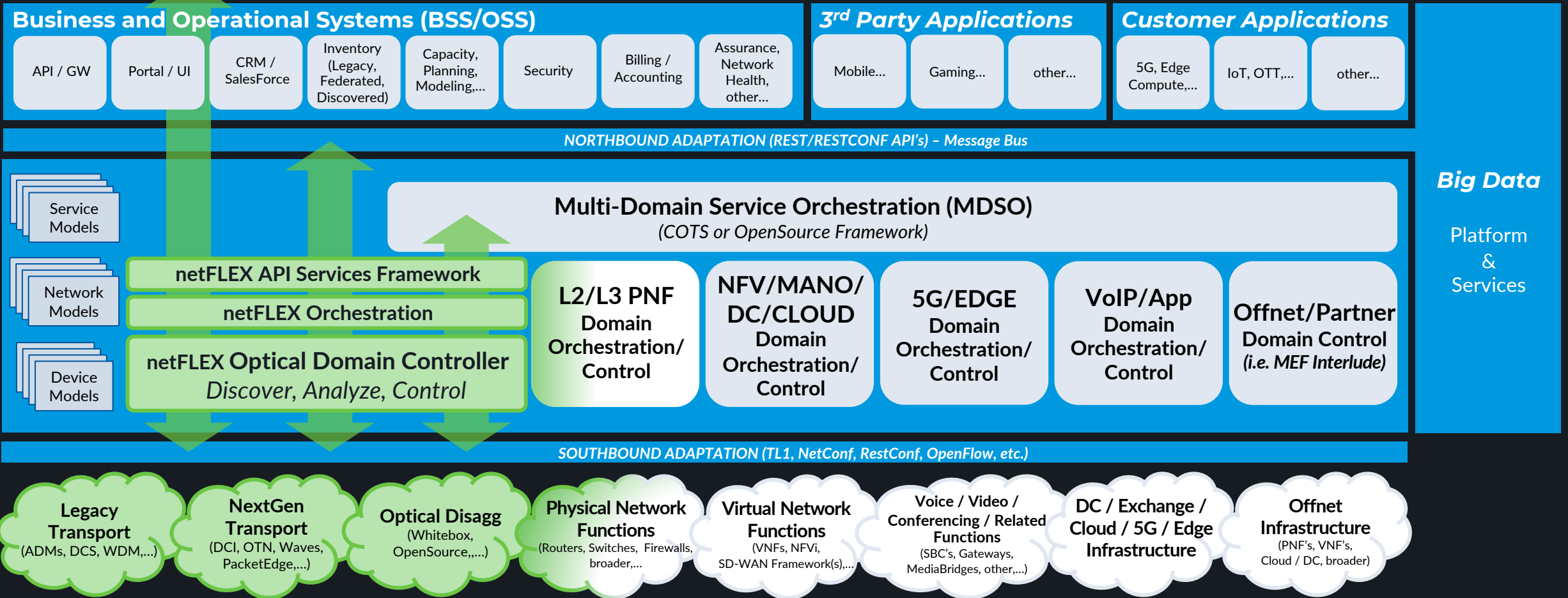
- PortManagement** (Execute a port management script on the server):
  - POST /PortHgmt/v1/Execute: Execute a port management script on the server
  - POST /PortHgmt/v1/Monitor: Retrieve the script output
- Inventory** (Retrieve the network inventory):
  - GET /Inventory/v1/ManagedElement: Get All Managed Element (MEs)
  - GET /Inventory/v1/ManagedElement/{TID}: Get one Managed Element (ME) Inventory
  - GET /Inventory/v1/MultiLayerSubNetwork/{MLSN}: Get MultiLayerSubNetwork (MLSN) Inventory
  - POST /Inventory/v1/Subscription: Send an inventory subscription request to the server
  - DELETE /Inventory/v1/Subscription/{SubId}: Send an subscription delete request to the server
- WavelengthServices** (Add, Update, Delete, or Retrieve Wavelength Services):
  - POST /WavelengthServices/v1/wvls: Provision a wavelength service.
  - GET /WavelengthServices/v1/wvls: Wavelength Service report
  - GET /WavelengthServices/v1/wvls/{svcNum}: Get one Wavelength Service
  - PUT /WavelengthServices/v1/wvls/{svcNum}: Update or Complete a wavelength service
  - DELETE /WavelengthServices/v1/wvls/{svcNum}: Delete a wavelength service
  - DELETE /WavelengthServices/v1/wvls/{svcNum}/Unmanage: Unmanage a wavelength service
  - POST /WavelengthServices/v1/wvls/Notification: Register a northbound system URI to POST change notifications to
  - DELETE /WavelengthServices/v1/wvls/Notification/{RegNum}: Delete a previously activated registration
  - GET /WavelengthServices/v1/wvls/ochCrss: Retrieve the Optical Channel Crossconnect (ochCrss) report
  - GET /WavelengthServices/v1/wvls/ochCrss/{ochCrssNum}: Retrieve one Optical Channel Crossconnect (ochCrss)
- WavelengthEncryption** (Retrieve or update wavelength encryption parameters on network elements):
  - GET /WavelengthEncryption/v1/CryptoModule/Firmware: Get the Crypto Module firmware information
  - GET /WavelengthEncryption/v1/CryptoModule/Security/LoginStats: Get the Crypto Module Login Statistics
  - GET /WavelengthEncryption/v1/CryptoModule/Security/PasswordState: Get the Crypto Module Password State
  - PUT /WavelengthEncryption/v1/CryptoModule/Security: Change the crypto module officer password
  - GET /WavelengthEncryption/v1/CryptoPort/Security/KeyStats: Get the Crypto Module key statistics
  - PUT /WavelengthEncryption/v1/CryptoPort/Security: Change the crypto port authentication key
- Performance** (Retrieve performance data from a port):
  - GET /Performance/v1/AllCurrentPmData: Get all current performance data
  - GET /Performance/v1/HistoryPmData: Get history performance data
- CircuitAnalysisTool** (Perform Circuit Analysis):
  - GET /CircuitAnalysisTool/v1/CircuitPe: Perform circuit analysis
- CutThru** (Send a TL1 or CLI command to a Network Element):
  - POST /CutThru/v1/TL1/{TID}: Send a TL1 command
  - POST /CutThru/v1/CLI/{TID}: Send one or more CLI commands
  - POST /CutThru/v1/Script: Execute a script on the server

The detailed view on the right shows a request and response for the endpoint `https://192.168.18.154/CutThru/v1/TL1/CIRMA-05005-1`. The response body is a JSON object containing a large block of text, likely a log or command output, and response headers including `Content-Type: application/json`.

# Extended Reference Architecture

As aligned to SDN 'control layer abstraction' view

netFLEX  
UI



# Strategic Platform Evolution

## FRAMEWORK CORE

### SDN Reference Framework

(Network Abstraction to Consuming Applications)

### Customer Network Management

(CNM, Optical-VPN as dedicated or multi-tenant)

### MultiVendor Resource Adapter Framework

(legacy Sonet/DCS/other, WDM, Layer 2 Edge, broader)

### Dynamic Network Operations

(DNO, for realtime discovered inventory)

### MultiDomain Health

(MDH, realtime telemetry and analytics engine)

### Path Computation Engine

(PCE, & A-to-Z design & connect... automated provisioning)

### UI/UX, MultiVendor/Domain

(uniform UI facing all technologies & use-cases)

### API/Services Framework

(northbound API's facing customer UI/UX, OSS, Orchestration)

### Platform Scale & Geographic Redundancy

(100's of thousands of nodes per instance and distributed)

## 2017-2019

### Data-Driven Assurance Automation

(Circuit Analysis Test for realtime path, test, & remediation -and- proactive/predictive network health visibility)

### Intent Based Networking

(IBN, control-loop automations for Optical Waves Restoration)

### Linux/Cloud Framework

(Redhat/CentOS extensible to Private/Public Cloud, dedicated or vm-based)

### Strategic Supplier WDM/OTN/DCI Enhancements

(Adva, Ciena, Cisco, Fujitsu, Infinera, Nokia and other industry leading OEM and Network-Disagg providers)

### Strategic Integrations – RA Dev, Swagger/API

(100+ RA's added, leveraging LightRiver labs/broader (including Packet Edge & Disagg). Introduction and scale-out of uniform API/Services framework)

### WDM Enhancements

(FixedGrid, FlexGrid, Open ROADM, Wavelength Carrier Grooming, MultiVendor Network integration, others)

### UI/UX Visualization Enhancements

(Global Map Views, CAT, Circuit Trace, FDP, broader)

### Platform Scale & Geographic Redundancy

(100's of thousands of nodes per instance and distributed)

## 2020 and STRATEGIC NEXT

### AI Analytics Engine

(enhancements to current threshold/ML based, as overlay services framework – supporting programmable visibility and control-loop use cases)

### \* Customer Defined Experience ( CDX™ )

(Customer & Operator self-serve definitions against data/analytics to personalize their EX & CX. UI/UX enhancements and redesign (\*Scoreboard), supporting self-serve for Network-as-a-Service, Cloud, Mobile)

### PCE Enhancements

(performance, Geo-based, broader extensions)

### WhiteBox / Open Source

(continuation of Network Disaggregation development)

### Packet Edge Control Automation

(broader advancements to L2/L3 edge support)

### \* intelligent Factory Built Network ( iFBN™ )

(FBN Network Health integrations at inception and life-cycle for proactive and consultative network & service health)

### Swagger/API Framework

(continuation of REST API/Services framework)

### Strategic Partnering

(Addition of new OSS/SDN/broader SW Platform Partners and extension of existing – with netFLEX as the 'nextgen transport abstraction-layer' to the industry)

# Network & System Integrations

## Partner Integrations and Development to SDN or OSS/NMS Platforms

- Ciena Blue Planet
- Exfo Ontology
- Ericsson WFA, TIRKS
- Fujitsu Virtuora & NETSMART
- Infinera DNA & Transcend
- Multiple OSS Platforms, REST Inventory Integrations
- REST/JSON, SNMP, TL1, ASCII, MTOSI/XML, netCONF/Yang, other Interfaces

## Next Generation Multi-Vendor Transport *(Supporting the networks being deployed today & tomorrow)*

- Adva FSP-3000R7, FSP-3000RE
- Ciena 6500 (FLEX, broader)\*, RLS\*, Waveserver, Waveserver Ai, CES\* (39XX, 51XX, 81XX, 87XX)
- Cisco NCS 2000 / NCS 1002
- Fujitsu 1Finity\* (T100 / T300 / T600 / L100 / L110)
- Infinera DTN/DTN-X, Flex-ILS\*, Groove\*, XTM\*, Cloud Express\*
- Juniper Router/Switch family\* (ACX, MX, other)
- Nokia 1830: 1830 PSS family, 1830 PSI-2T, 1830 PSI-M\*
- Disaggregated Networks / Open ROADM / White Box\* (SmartOptics, Inphi, others underway...)
- ....others....

## Classic and Legacy equipment supported, many others in addition to this list as well:

- Accedian EtherNID/MetroNID -- Anritsu 9620, 9622, 9967
- Adtran Opti-6100, MX2800/2810/2820
- Aethera (fMarconi, fPositron) OSR OC3 XTD, OSR OC12 XTD
- Ciena Multiwave Metro, OC3 Express, 5410/5430, Optical Multiservice Edge 6500/OTN/EMOTR, 3100/3300/3400/3500/5100/5200/6110/6130, OC3/12 TBM, S/DMS TN OC48/OC192/Lite, Connect DX, Core Director/Core Director CL, Z-Series
- Cisco ONS 15454 (M2, M6, M12), 15327, 15600, 15800, ME3400, ONS 15310 MA/CL, 7609, 2650XM, Catalyst 2960/3400/3550/3750, MGX1/MGX45, Various other Routers/Switches
- Infinera/Coriant (fNSN) 7300, 7500, (fEastern Research/Sycamore) DNX-11/88, (fTellabs) 532x family, 5500, 5500 NGX, 7100
- Fujitsu 7120, 7420, 9500 & 9500 HDS, FACTR, FLM 6/150/ 150+/600/2400, Flash192, Flash4100LS/4300/4500, 7500, CDS, Flashwave 4100ES
- Nokia (Alcatel-Lucent) 1631 LMC, 1665 DMX, DMXtend, DMXpress, DMXplore, 1671 SC, 1675 LambdaUnite, 1677, 1678 MCC, 1692 MSE, 1695 WSM, 1696 MS, 1850 TSS family, 7330 ISAM, 7705/7750/7250/7450/OS6850, BSTDX8000, BSTDX9000, CBX500, DACS II/II-ISX/II-CEF/III/IV, DDM-2000, FT-2000, FiberReach, GX250, GX550, Litespan 2000/2012, MDR-8000, 9500 MXC, 9500 MPR, PSAX 1250, SLC2000, WaveStar 2.5G/10G/400/800G/BWM
- Juniper BTI7060/7800
- Telmar (Alcatel) 1603 SMX, 1630 SX, 1631 SMC, 1633, 1648 PS / LS, fDSC CS1/CS1L
- .....lots more.....

# Industry Leadership



## INDUSTRY FIRST

\* intelligent FACTORY  
BUILT NETWORK (iFBN)

Automation 'Baked In'



## #1 GLOBALLY

TECHNOLOGY SUPPORTED

#Suppliers

#Transport Network Elements

#Generations



## #1 N. AMERICA

DIGITAL EXPERIENCE (DX)

Optical-VPN:

Customer UI/API Self-Serve

#SP End Customers

#SP End-Site-Locations



## INDUSTRY FIRST

\* CUSTOMER DEFINED  
EXPERIENCE (CDX)

Custom-defined  
programmability of network  
health



## #1 N. AMERICA

MULTI-VENDOR  
TRANSPORT LABS

#Suppliers & Partners

#Technologies Supported



## #1 GLOBALLY

SOLUTION SCALE

Largest Scaled-Out deployment

(Tier 1 SP: 340K+ NE's)



## #1 N. AMERICA

TIER 1 SP DEPLOYMENTS

2 of 3 Wireless

4 of 5 Wireline



## #1 N. AMERICA

LIFE-CYCLE-AUTOMATION

Multi Vendor & Technology:

- Greatest Capability Enablement  
- Integrations, #API's supported

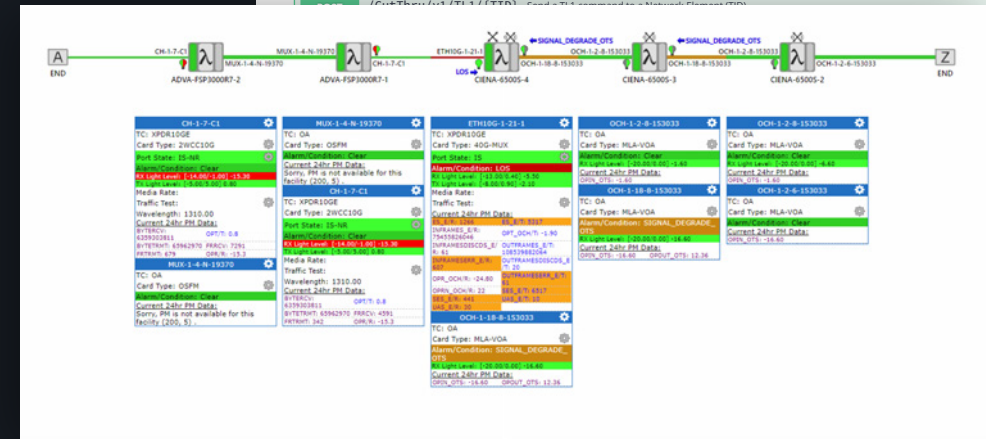
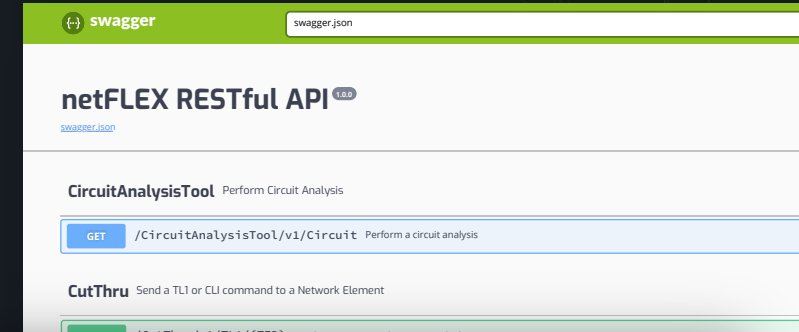
# Analytics Driven Automation

## Circuit Analysis Tool (CAT)

When a service impact in the optical transport domain occurs today, technician time and understanding to resolve is excessive and reactive. The tech must determine service-path (from static OSS or disparate EMS'), nodes traversed, familiarity with all nodes involved to login/run troubleshooting commands to isolate and resolve the issue. This can take 20-30 minutes, requires vast understanding of the technologies involved, and occurs 'much after the fact.'

With **netFLEX®** a single UI-click or API-call against the customer's circuit initiates **Circuit Analysis Tool® (CAT)** to automatically determine the service path from 'active inventory,' automatically retrieves critical information for each node, presents a single-analysis-view, and most probable isolation for remediation. Control automation options are then presented to restore service.

Automated End-2-End, **netFLEX CAT** provides simplified service-path troubleshooting for complex Legacy and Nextgen optical networks. With wide support for disparate suppliers and technologies, it eliminates the need for specialized skills for individual network technologies and reduces the 20-30 minute troubleshooting time to 1-2 minutes. In addition, **netFLEX CAT** eliminates excess cost by assuring that resources are dispatched correctly the first time and only when necessary. Available through a common UI and API framework, **netFLEX CAT** makes multi-vendor optical networks all look the same to users and integrated OSS and SDN Orchestration systems.



**Circuit Analysis Tool (CAT)**  
**Reduce Troubleshooting From 20-30 Minutes to 1-2 Minutes**

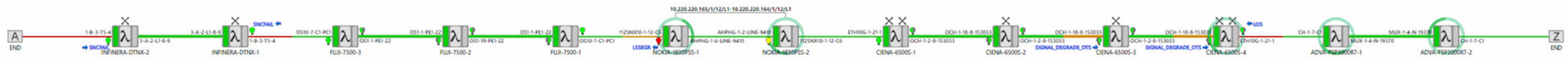
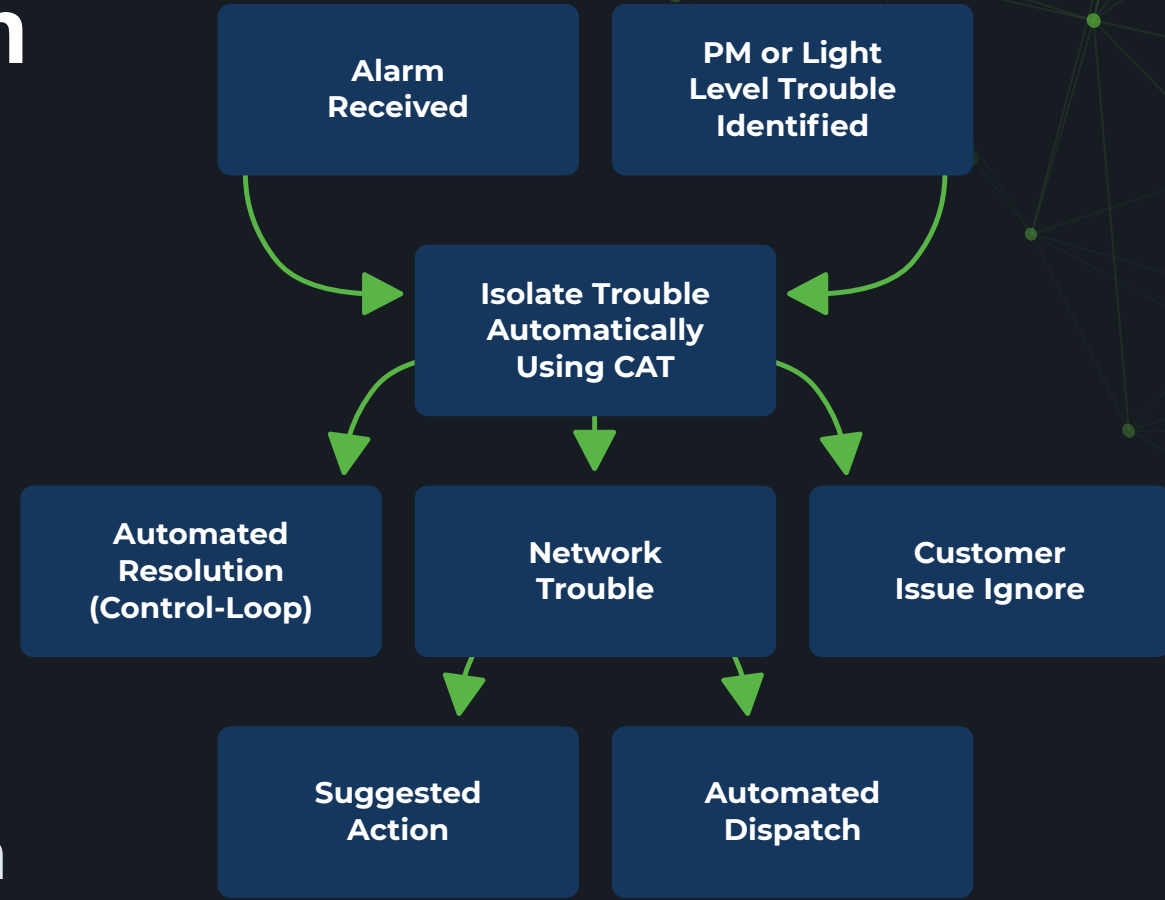
# Analytics Driven Automation

## Proactive Optical Waves Restoration™ (POWR)

CAT with POWR takes this a step forward, as a policy-driven input at service instantiation (or after). netFLEX PCE for upfront control automation of A-to-Z provisioning, incorporates policy for ingestion of realtime data and decisioning to enact CAT to auto-detect, -test, -triage, and auto-restore to original business (service) intent.

Human action, to restore a Waves Service impact, in reactive fashion – now replaced by POWR for near-realtime detection and resolution (leveraging the netFLEX Automation Framework).

# CAT + POWR = Programmable Waves Restoration, No Human Action



<b>1-B-3-TS-4</b> TC: XPDR10GE Card Type: TIM-5-10GX Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>3-A-2-L1-B-9</b> TC: OA Card Type: BHM-6-Cxx Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>0510-7-CI-PC1</b> TC: 10G Card Type: UNIV-ETH-10G-XPDR Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>051-1-PE1-22</b> TC: OA Card Type: UNIV-AMP Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>051-1-PE1-22</b> TC: OA Card Type: UNIV-AMP Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>1120NX10-1-12-C6</b> TC: XPDR10GE Card Type: 1125NX10 Port State: OOS-ALMA, FAP Alarm/Condition: LESSEER Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>AMPHG-1-2-LINE-9410</b> TC: DAC Card Type: AMPLIFIER Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>ETH10G-1-21-1</b> TC: XPDR10GE Card Type: 40G-MUX Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>0CH-1-18-8-153033</b> TC: OA Card Type: MLA-VOA Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>0CH-1-18-8-153033</b> TC: OA Card Type: MLA-VOA Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>0CH-1-18-8-153033</b> TC: OA Card Type: MLA-VOA Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>0CH-1-7-C1</b> TC: OA Card Type: 40G-MUX Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found	<b>MUX-1-4-N-19370</b> TC: OA Card Type: 40G-MUX Port State: No Response File Found Alarm/Condition: SNCFAIL Media Rate: No Response File Found Traffic Test: No Response File Found Current 24hr PM Data: No Response File Found
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# Service Life-Cycle Automation

## \*PERSONALIZATION

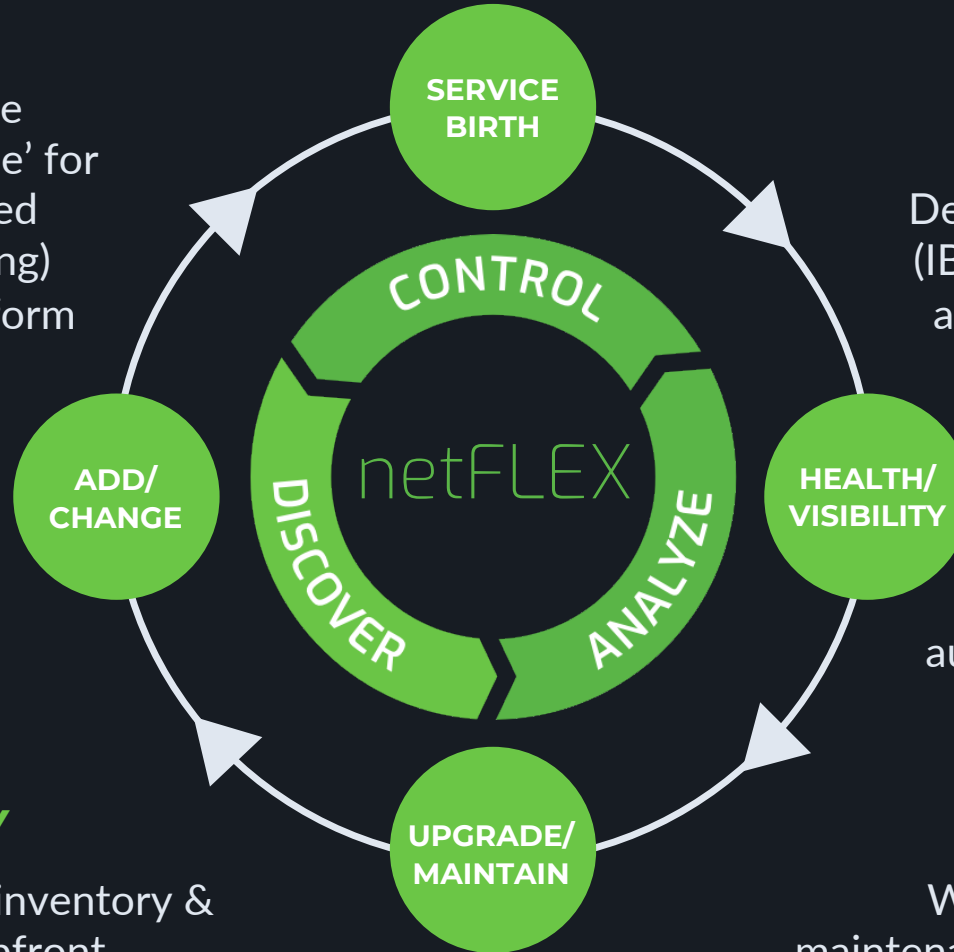
From birth and beyond – ability for the user to uniquely ‘define the experience’ for OnDemand, Scheduled, or Programmed (Data-Driven, Intent-Based-Networking) interactions. And... do so through uniform UI and API access.

## ADD/CHANGE

Similar to birth, ability to add/change service at any point after through UI/API for OnDemand instantiation.

## EVERY SECOND, EVERY DAY

Realtime and all-the-time discovered inventory & analytics to monitor service against upfront Golden Config and Policy. Available to all apps to auto-detect, -fix, -notify, and -maintain.



## SERVICE BIRTH

PCE and A-to-Z automation for ‘service birth.’ Instantiated with Realtime Design/Inventory, Golden Config, & Policy (IBN) for automation of all Day 2 visibility-and-control to ensure service uptime and performance.

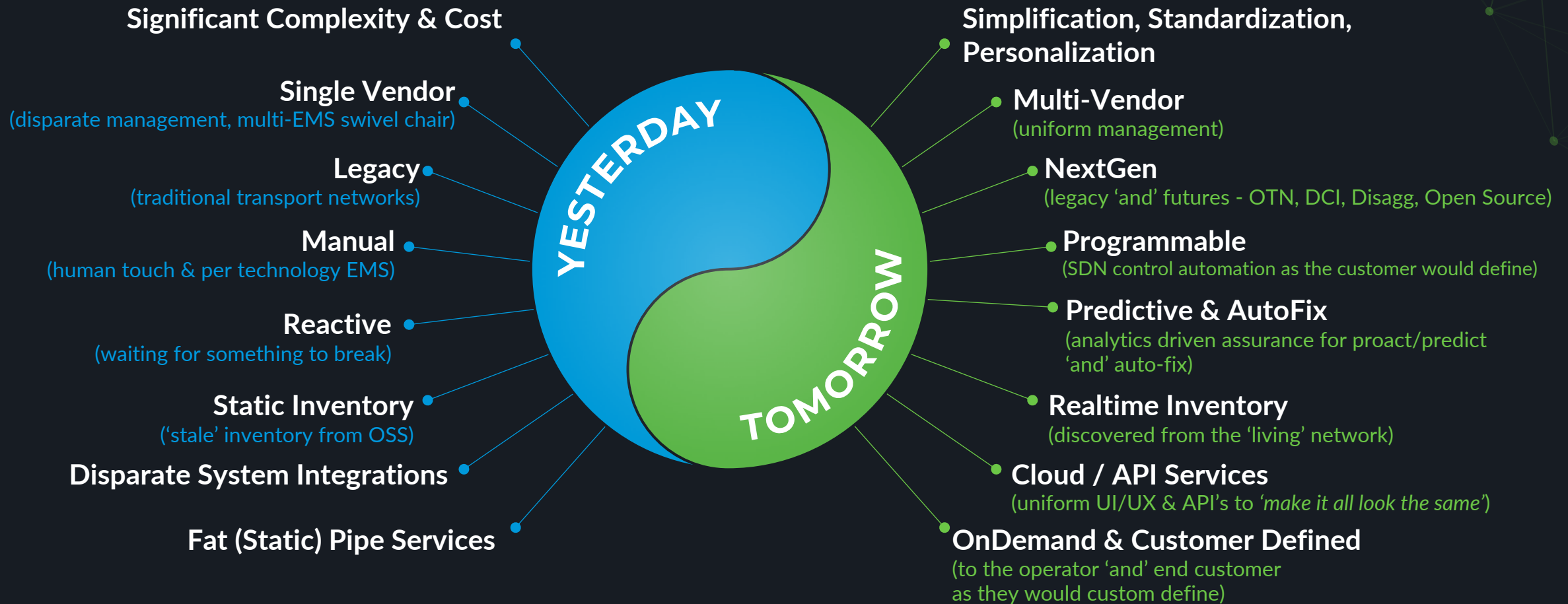
## HEALTH/VISIBILITY

Any exception to Day 1 ‘birth’ around Golden Config and Performance is auto-detected, auto-tested/triaged, auto-notified, and auto-fixed where possible.

## UPGRADE/MAINTAIN

When a network upgrade, groom, routine maintenance or similar work is required - control automation is leveraged to do in bulk, scheduled, or other ‘human hands off’ options.

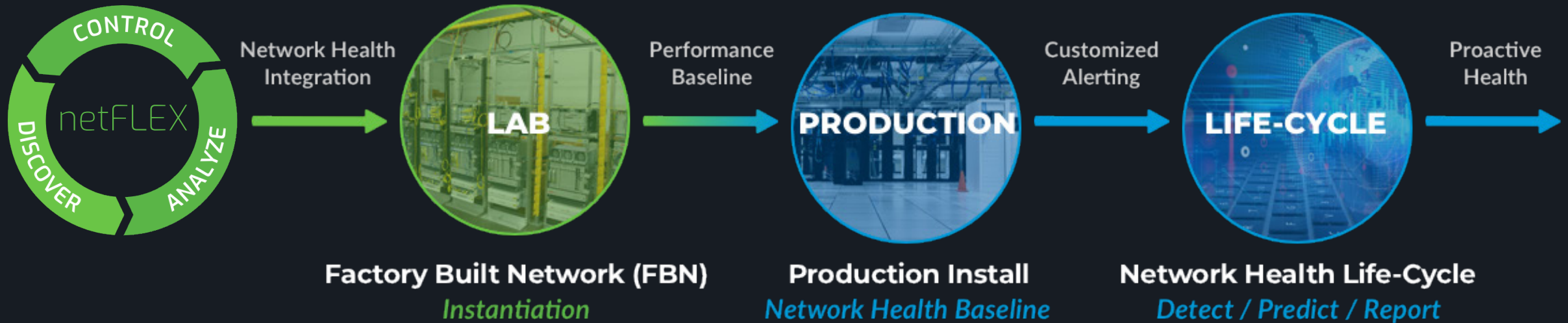
# Optical Networking Bridge



# Intelligent Factory Built Network

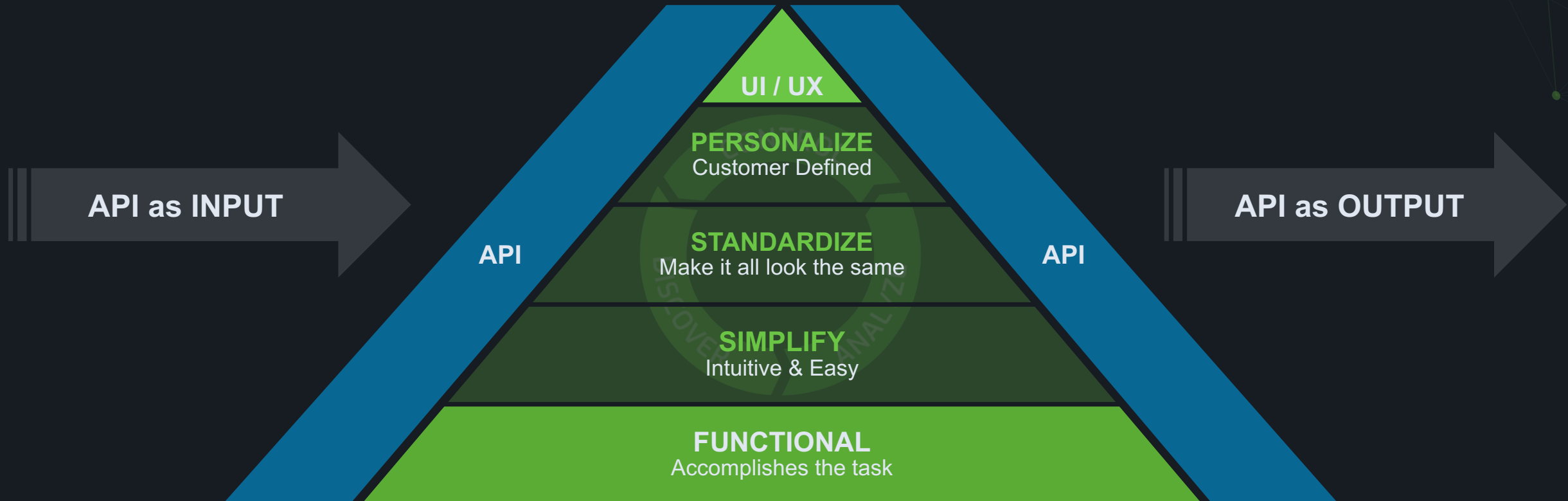
## iFBN

- **Intelligent** automation that is integrated into the Factory Build Process
- **Network health** for performance, inventory/config, capacity management, and more
- **Customer personalized** 'touch' for proactive awareness, automated remediation, and Day 2 LightRiver Pro Services
- **Customizer defined** throughout the process



# Customer Defined Experience

Input, Control, Action



# netFLEX<sup>®</sup>

Simplify, Standardize, Personalize