

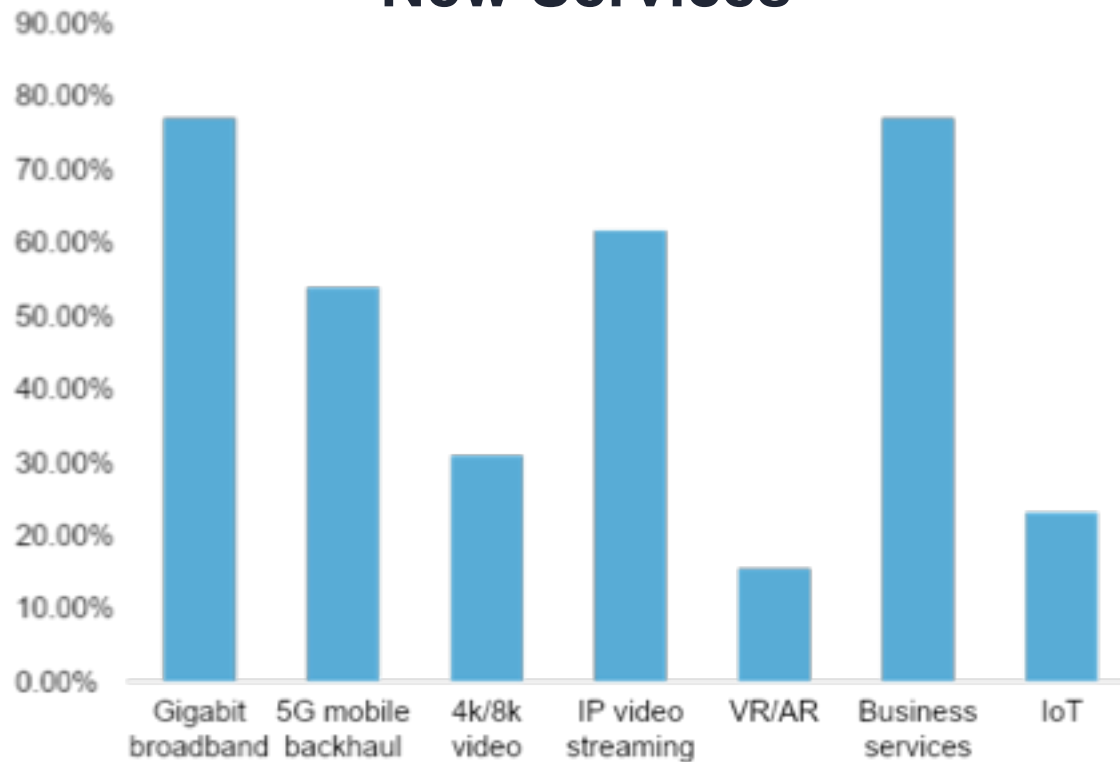
Data over Cable with Gigabit Passive Networks

How to maximize and modernize
operations to support both



90% of service providers are investing in more fiber—why?

New Services



Other considerations

Regulatory

- Singapore—StarHub cable shutdown
- Mexico—Gigabit Passive Optical Network and cable overlapping competitive footprint

Cost reductions compared to cable networks

- 30%—maintenance
- 40%—home visits

Power consumption

- Active to passive network components—eliminate power supplies, radio-frequency amplifiers, connectors



What are the operational challenges with fiber-based services?

We talked to global service providers.

Incognito partnered with Heavy Reading in late 2018 to uncover the challenges - surveying **150 service provider respondents globally.**



Legacy Operational Support System is top barrier to scaling fiber services.

50%+

Operators cite legacy Operational Support System barrier to scaling fiber services

Top challenges for delivering fiber services

- 1 Integrating new fiber customers onto legacy Operational Support System
- 2 Internet Protocol version 6 readiness
- 3 Managing both Passive Optical Networks and cable networks during fiber transition or fiber deep into access

How will operators address fiber operations?

48%

Retrofit existing Operational Support System

31%

Replace system with new Operational Support System stack

21%

Introduce new fiber-specific stack

Multiple operational models will be needed.

Source—Heavy Reading and Incognito 2018



Fiber services are driving new approaches.

Operational Support System strategy for fiber deployment

40%

Will use **Data
Packet over
Glass or
Ethernet**

30%

Will use **Radio
Frequency over
Glass**

Shifting approaches to device management

53%

Will use **Data
over Cable**

41%

Will use **TR-069**

Source—Heavy Reading and Incognito 2018



Service configuration and activation a key concern.

Which Billing and Operational Support Systems will be most impacted by fiber services?

57%+
Service configuration
and activation

Top service activation and management challenges

- 1 Upgrading cable customers to fiber—network and services migration
- 2 Integrating fiber customers onto legacy Operational Support Systems
- 3 Gigabit Passive Optical Network introduction brings new devices, new Element Management Systems and more integration

Source—Heavy Reading and Incognito 2018



Greenfield vs. Brownfield

Different fiber service operational models driven by business case

Greenfield

No legacy infrastructure—
geographic expansion,
service expansion, new premise builds



Brownfield

Install fiber alongside legacy technology
and/or supplement cable access



Multiple scenarios often prevail

Greenfield



Multiple Scenarios

- Business case driven
- Cost to upgrade - roll fiber
- Competition
- Migration from cable to fiber
- Future mergers and acquisitions

Requires common platform approach to operations

Brownfield



Common platform – Hybrid Operational Support Systems Considerations

Multiple Scenarios



Support both models simultaneously - leverage existing operations systems vs. implement new stack

Flexible service modeling—support multiple service packages

Library of proven standards-based interfaces - north-bound to billing/operational and south-bound to element management systems

Extensive automation—device discovery, provisioning/activation, fulfillment, diagnostics

Built-in Internet Protocol version 6 support – IP services

Cloud integration — Over the Top, Internet of Things



Greenfield fiber—considerations

Greenfield



Retrofit cable Operational Support System to fiber while co-existing with operational data over cable systems and infrastructure

- Network abstraction with Data Packet over Glass, Data Packet over Ethernet or Radio-frequency over Glass support

Direct provisioning for new Fiber to the Home/Business – new stack (hybrid Operational Support System)

“Fiber is different operational animal”– brings new challenges: skill set, mind-set, devices, IP services



Brownfield fiber—considerations

Brownfield



Business case-driven

- Where is plant: ground or pole
 - Competitive scenarios
-

Multi-access network technology

- Fiber to the node/building
 - Coax to premise
-

Extensive automation for Distributed Access Architecture (DAA)

- Provision new remote edge devices (Remote Physical, Remote MAC + Physical, Remote Optical Line Terminal)
- Zero-touch remote configuration



NETWORK VENDOR NEUTRALITY AND OPEN INTERFACES 61 %

DEVICE SCALING 52 %

HANDS-OFF AUTOMATION—ZERO-TOUCH 53 %

FUTURE-PROOFING FOR GOING FIBER DEEP 52 %

What are your Distributed Access Architecture provisioning approaches you are considering as an operator?

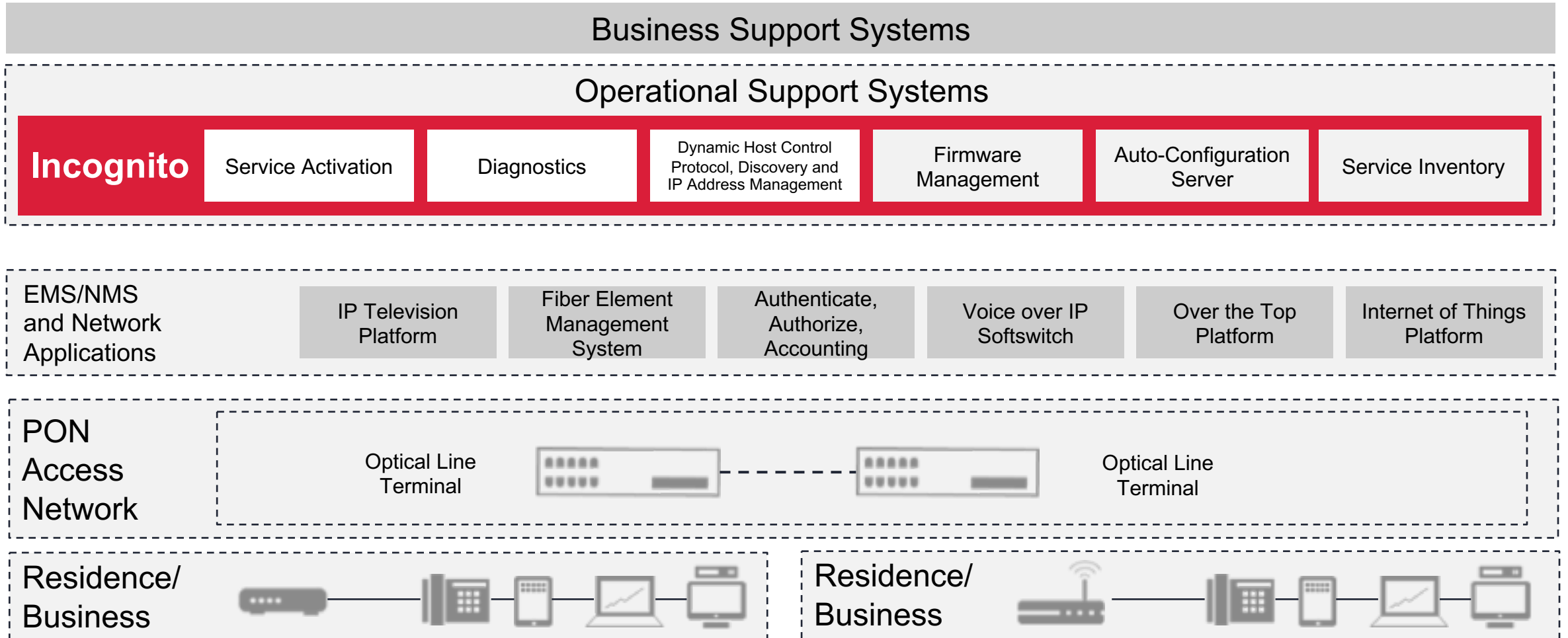
Network vendor neutrality and open interfaces top the list.

%



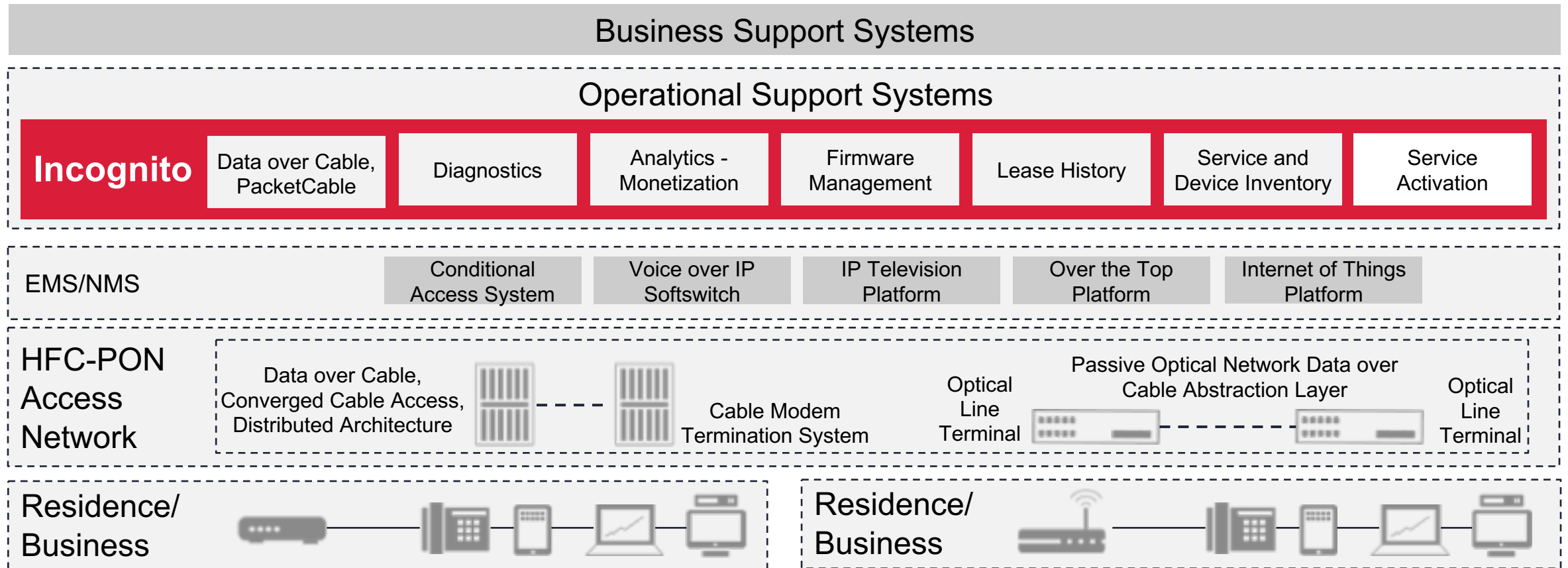
Reference Architecture

Fiber to the Home/Business Scenario - Direct Passive Optical Network Provisioning

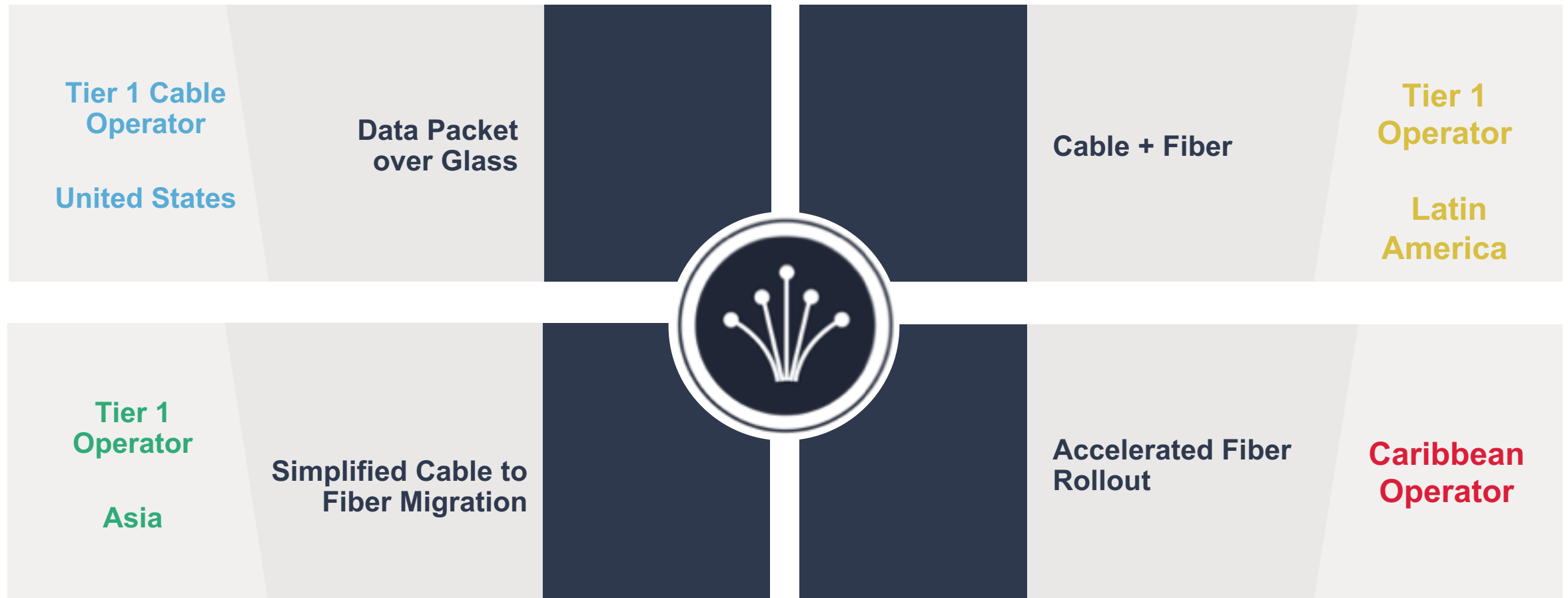


Reference Architecture

Preserve investment in legacy Data over Cable back-office



Incognito Customer Examples



Tier 1 U.S. Cable Operator

Data Packet over Glass Services

Leverage massive back-office Data over Cable investment



Business Challenges

- Legacy Operational Support System hindering IPv6 launch spanning Gigabit Passive Optical and Data over Cable network
- Operations impact from 'one-off' customer manual provisioning processes

Incognito Solution

- Common cable/fiber residential and business services platform – 25M devices
- Usage based billing across data over cable and Fiber
- Automated provisioning workflows

CSP Benefits

- Reduced provisioning siloes
- Shortened order to cash - process automation
- No downtime during migration phase
- Improved monetization opportunities – better insights



Tier 1 Asian Operator

Cable to Fiber Migration

Enabled By
Centralized
Platform



Business Challenges

- Minimize service interruptions
- Complete high volume activations

Incognito Solution

- Enabled postpaid and prepaid subscriber services – boost monetization opportunities
- Triple play service provisioning – cable/fiber
- Rapid migration – cable to fiber

CSP Benefits

- Common hybrid operational support systems stack—no retrofit
- Simplified migration—across multiple network types



Tier 1 Latin American Operator

Operational efficiency from fiber + cable centralized management



Business Challenges

- Introducing fiber
- Multi-vendor network – vendor silos
- Manual error-prone processes

Incognito Solution

- Holistic automated service fulfillment and provisioning across fiber/cable and metro-ethernet
- Enabled IPv6 readiness
- Integrated IP address management

CSP Benefits

- Process automation—provisioning devices & improved Service Level Agreement adherence
- Centralized subscriber services view—facilitate troubleshooting
- Reduced configuration errors, fallout



Caribbean Operator

Greenfield Fiber to the Home Residential Services



Business Challenges

- Aggressive greenfield fiber rollout plan for triple-play services
- Time to market a key imperative
- New to fiber

Incognito Solution

- Pre-integrated platform for service provisioning, activation, remote device management, IP address management
- Segregated access controls by country

CSP Benefits

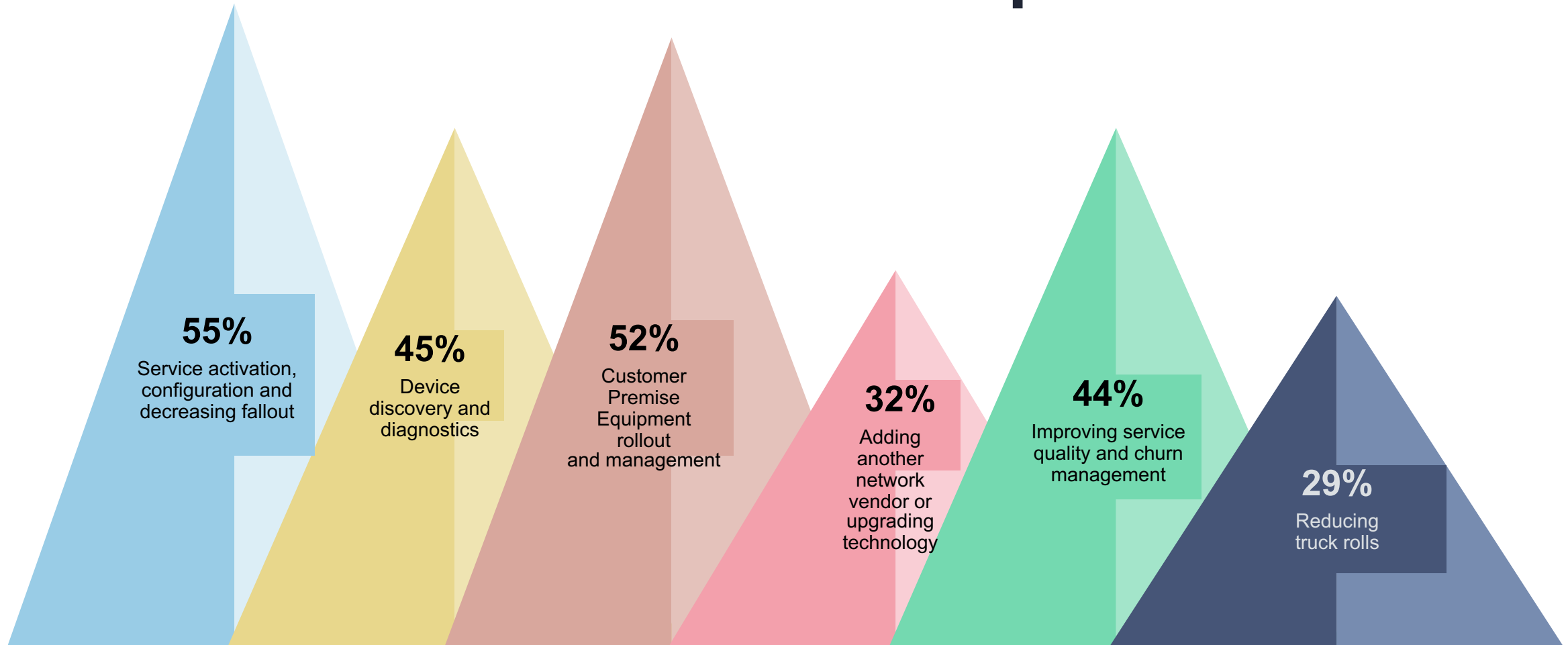
- Centralized visibility of Gigabit Passive Optical Network assets, services & subscribers
- Multi-tenancy on per country basis
- Enabled rapid growth beyond 150,000 Fiber to the Home subscribers with end-to-end automation



Looking ahead...

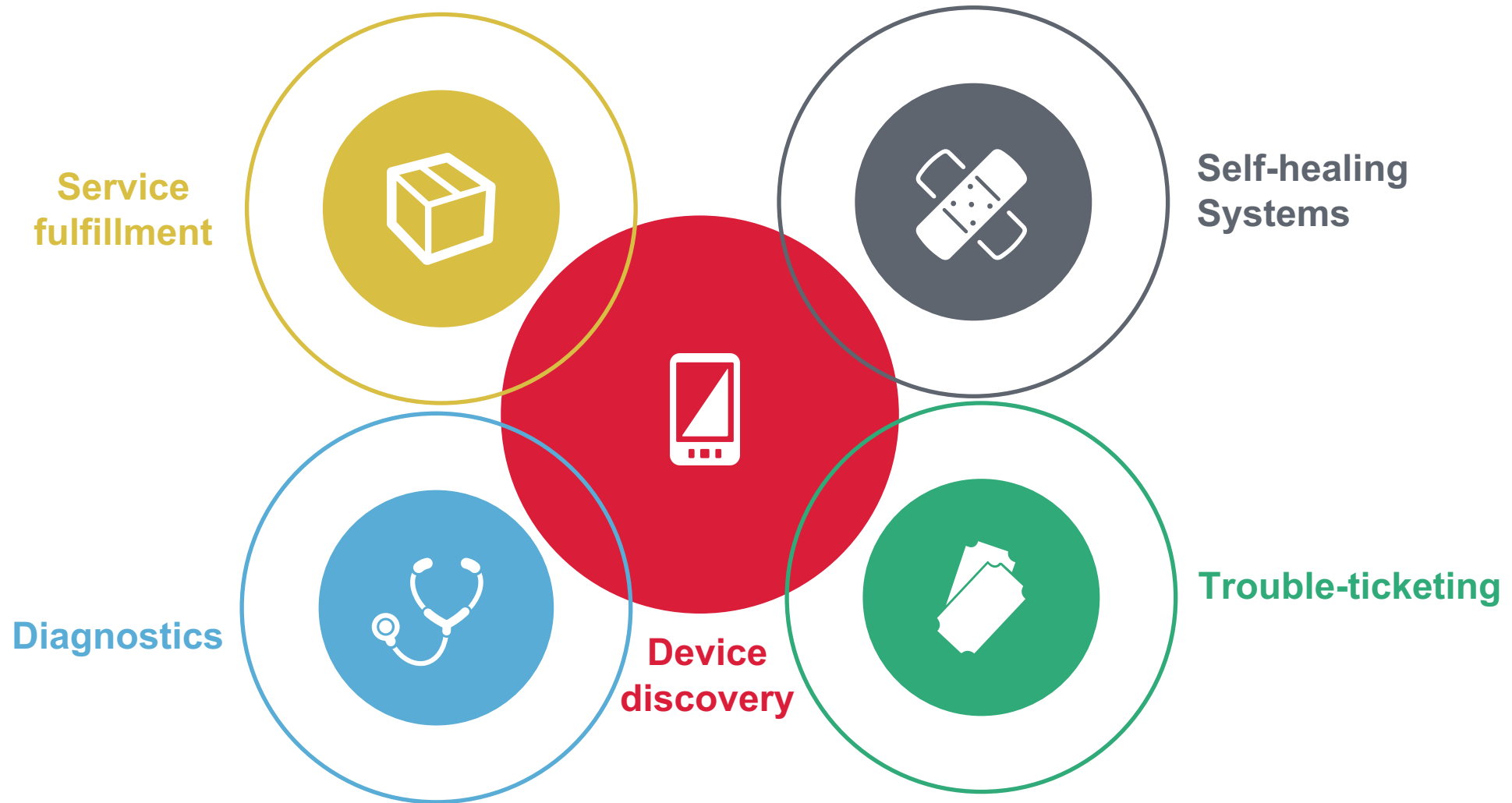


Where will global operators focus in next 12-18 months when it comes to **fiber operations**?



These capabilities are central to Incognito solutions today

Device Discovery - anchor for process automation



Drives inventory, complex diagnostics and trouble ticketing flows

Technology and Standards

Network virtualization

Distributed Access Architecture

Converged Cable Access Platform

Cable Modem Termination System

Customer Premise Equipment

Virtual Optical Line Terminal
Hardware Abstraction

**Network abstraction is key—
consider Network Function
Virtualization + legacy +
hybrid**

Data over Cable 4.0 and full-duplex

CableLabs®

CableLabs compliance,
future-proofed
Data over Cable provisioning

Standards bodies

Autonomous networks project

tmforum

Incognito—active participation
and industry contributor



Gigabit Passive Network & Data over Cable Operational Modernization

Incognito Best Practices



1

Hybrid Operational Support System platform

- Manage both Data over Cable and Gigabit Passive Optical networks from single platform

2

Abstract network layer and be vendor-neutral

- Avoid the pain and time-to-market delays of bringing on new vendors and devices

3

Standardized and productized solutions

- Achieve flexibility for rapid solution delivery/deployment & improved time to market

4

Automate—automate—automate

- Cohesive operational support systems architecture
- Service fulfillment, activation, configuration, device management, service assurance, device discovery

5

Co-exist where possible

- Minimize Billing and Operational Support Systems impact
- Northbound interfaces critical





Thank You

