Growing Tribal Broadband

with a winning value proposition

Cisco Systems

10th April 2024

Welcome

o Alice Sanchez – Pomo, Choctaw & Hawaiian Compliance Engineer, Native American Network Global Co-Lead

o Aaron Murphy – Diné (Navajo), Mobility Engineer (NCE), NAN Core team
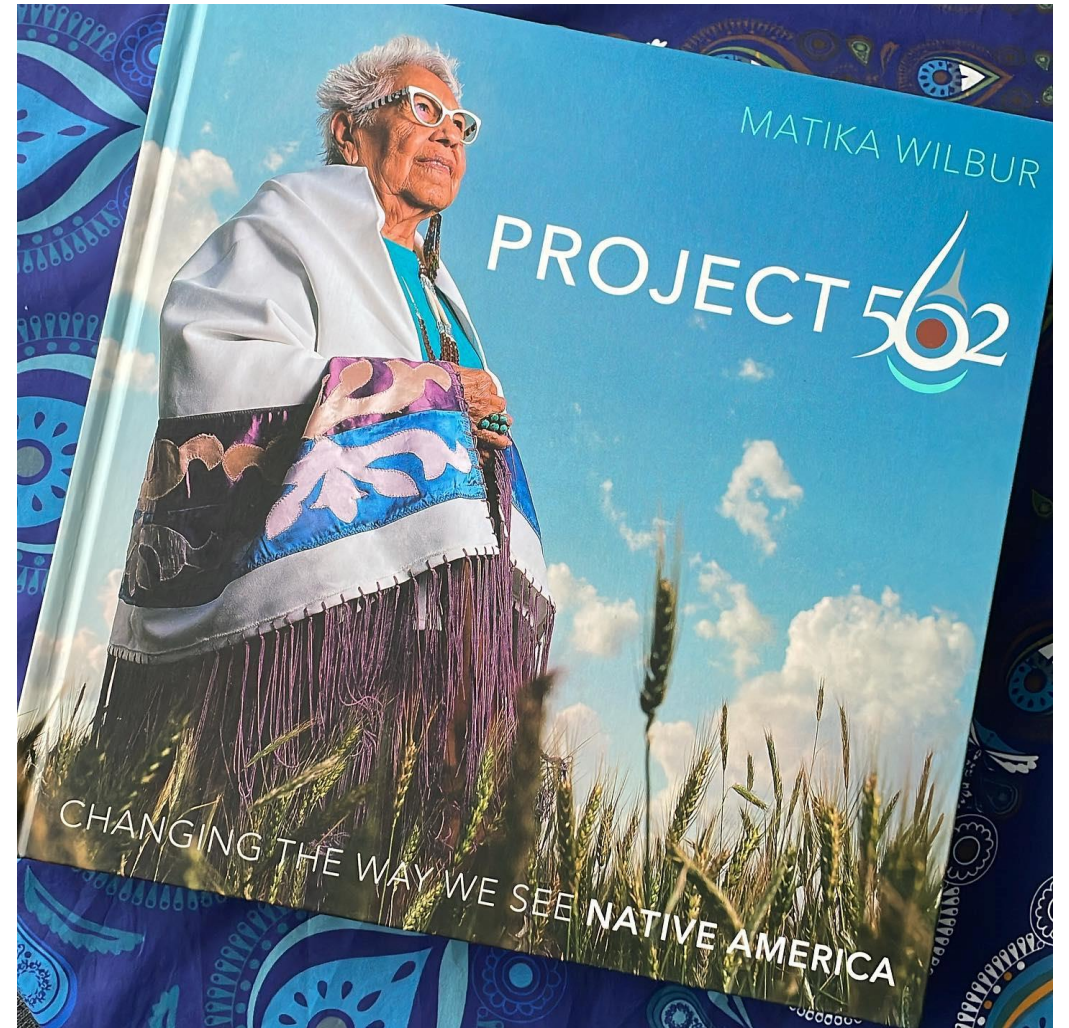
About Cisco Native American Network NAN

Background

- Programmer, Artist, Educator, Network Engineer, Programmer.

Flow & Mission

- Extreme Independence
  - Holdover from Trauma
- Worked in Isolation all Native
- Large Corp, Being Native is a Choice
- Eliminate BIA mindset
  - Don't have to be perfect. (Agile)
  - Make decisions
- FIND your mission
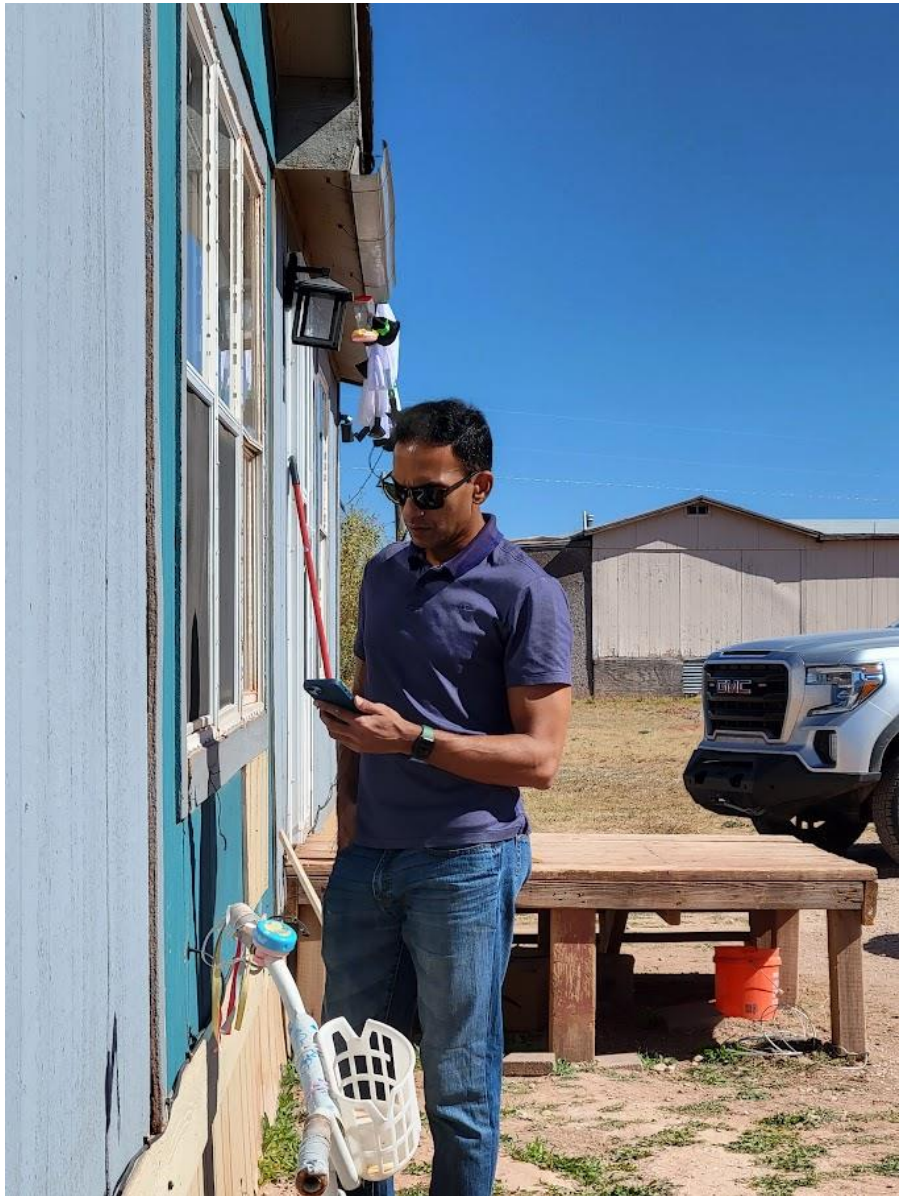 - Directly affect your Relatives & People

Natives Not Standing Still

- Zuni hedging their bets

- Broadband FWA Ashiwii college

- Redbolt Fiber

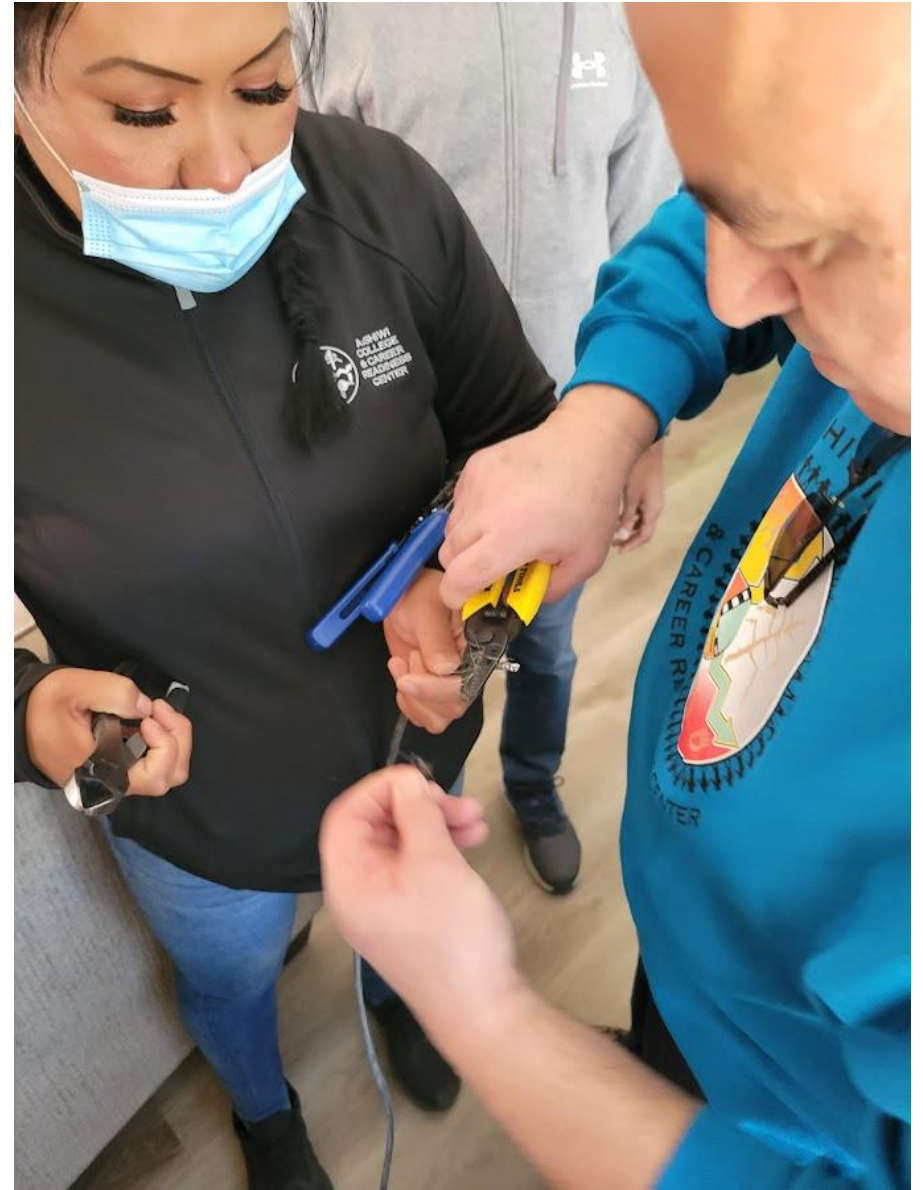- Terrestrial Mobility – Big 3

- Hughes, Starlink Satellite

Zuni

Knowledge Training

- Higher level systems are not structured
  - Goes against Native world view

- Fail, Learn, Repeat.
  - Fail Fast!

- Own it and Take it with you

- Fierce Independence

Contents

Exploring 3 levers

Matthew Dietz

1. Broadband Services

Alistair McGrath

2. Broadband Technologies

Sara Shreve

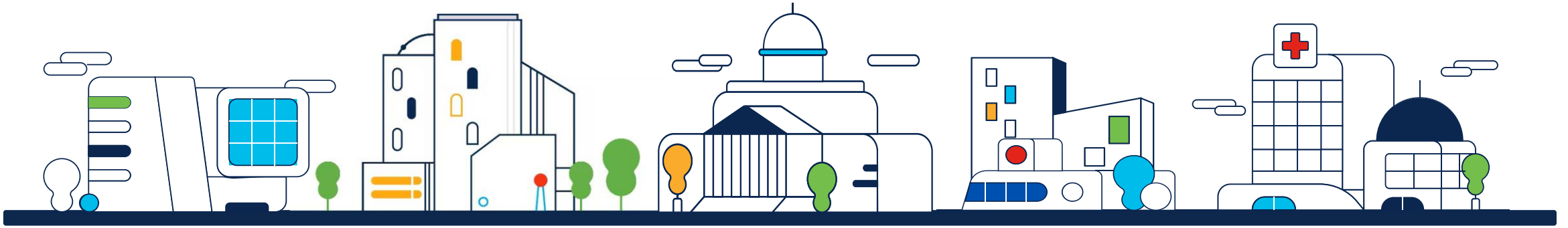## 3. Broadband Skills

Broadband Services

Establishing a secure, resilient, and agile digital foundation enables you to reimagine your digital community.

Communities Reimagined

Establish a secure, reliable, resilient, and agile digital foundation for government, residents, and economic growth.

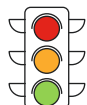| Inclusive Infrastructure | Resiliency & Reliability | Data-driven Enablement | Comprehensive Security | Sustainability |

Digital Divide | Education | Connected Justice | Roadways | Transportation | EV Charging | Renewables | Healthcare | Airports & Ports | Sports Venues | Resident Services

Sports and Entertainment

Digital Government & Residential Experiences

Airports and Ports

Digital Equity

Transportation & Roadways

Healthcare

Education

Connected Justice and Public Safety

Cybersecurity Data Privacy, & A.I.

Utilities and Critical Infrastructure

Cisco Secure & Resilient Data Transport Infrastructure
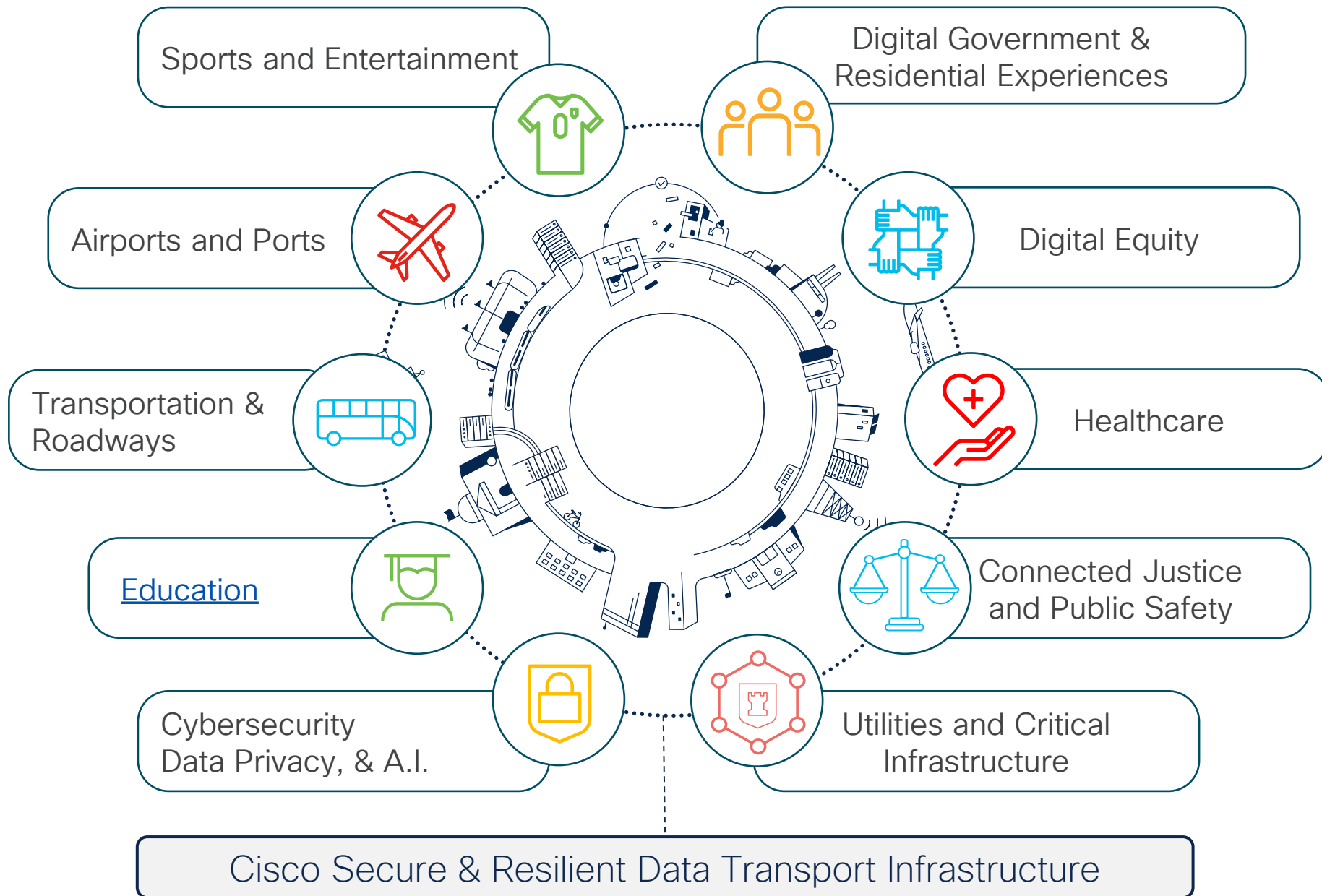
Building on the platform towards outcomes…

Sustainability

Economic Expansion

Enhanced Citizen Experience

Digital Equity

Hybrid Work

Secure & Equitable Access

Innovation & Growth

Reliable Services
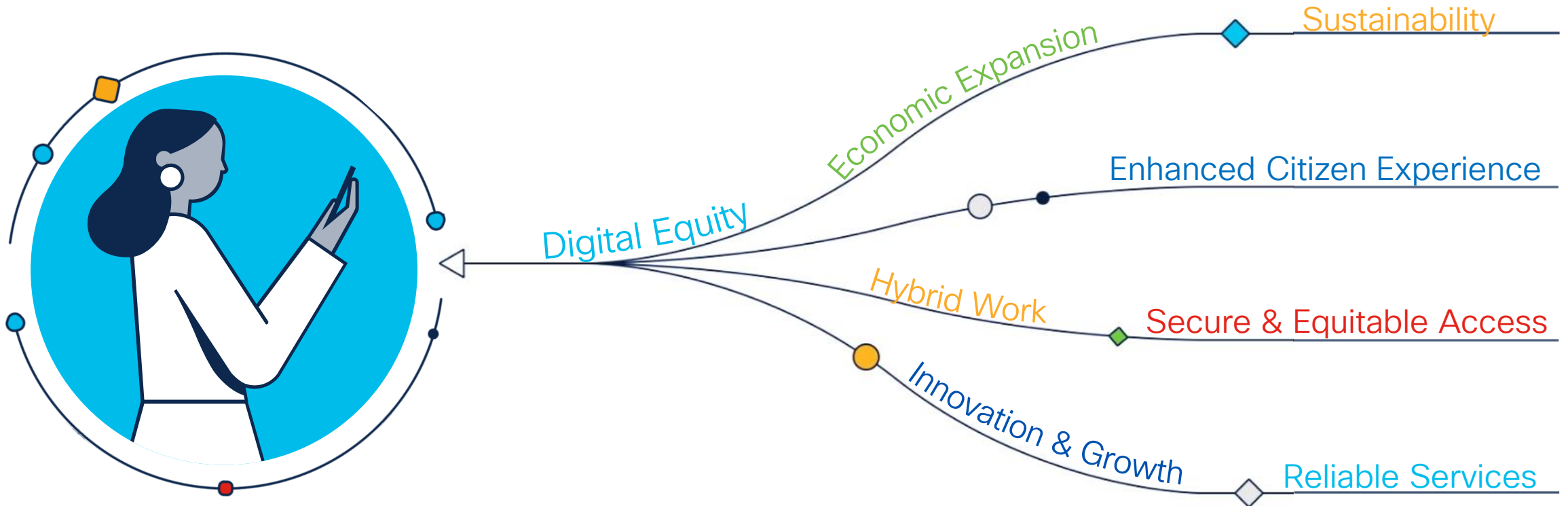
Connectivity has a major part to play in…

Transportation

Airports & Maritime Ports

Sports & Entertainment

Secured Critical Infrastructure

Connected Justice

Health & Care

Economic Expansion

Public Safety

Digital Equity

Education
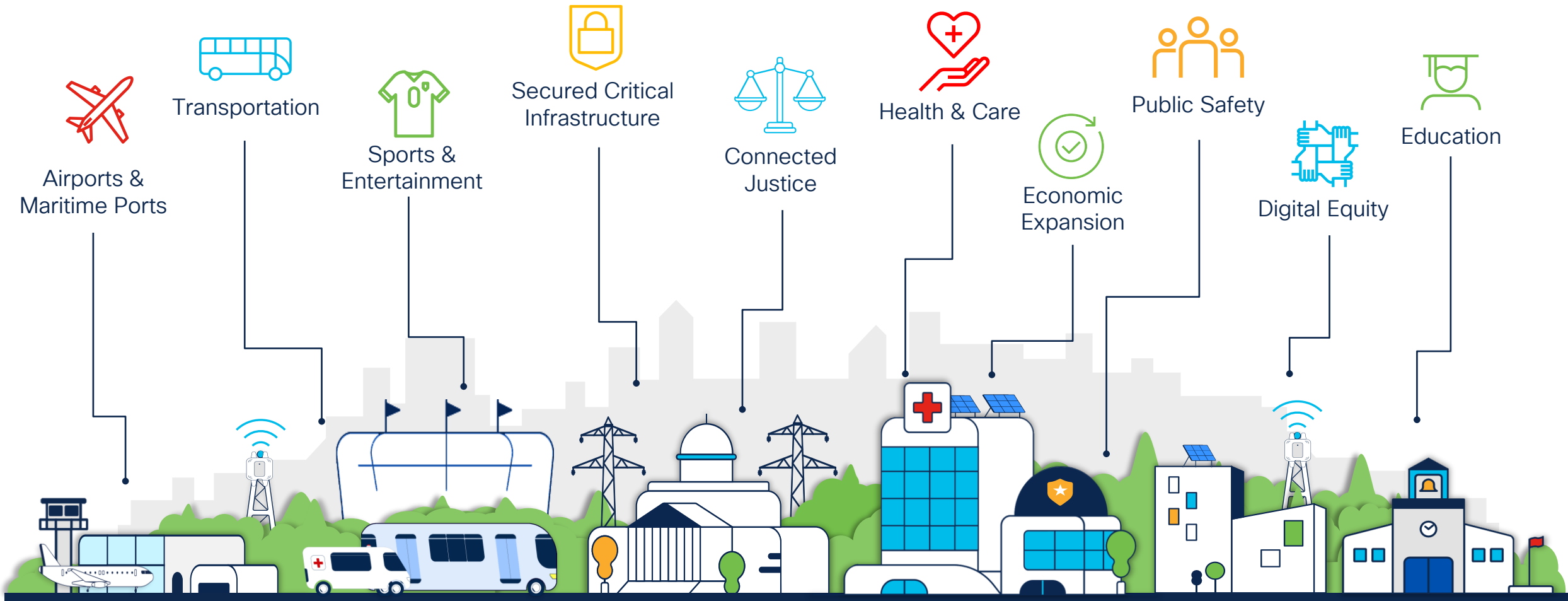
Cisco Communities Reimagined Infrastructure

An intent-based, AI-ready, network for cities and communities
which greatly simplifies deployment, management and security

Roadways

Rail and
Metro

Safety and
security

Lighting

IoT
Parking, Waste
and IoT sensors

Environment
and water

Cisco® Connected Communities Infrastructure

Cisco Intent-Based Networking and Software-Defined Access

Ethernet
and fiber

Outdoor
Wi-Fi

Ultra-Reliable
Wireless Backhaul

Cellular

LoRaWAN

Wi-SUN Mesh

V2X
(Vehicle to Infra)

Edge
compute

Simplified

Deployment
Management
Security

Secure
Ruggedized
Modular

Validated Design

Broadband Technologies

One network with many services

Shared Cloud Services

Public Safety

Municipal Utilities

Mobile & IoT

Industry

Cybersecurity

Collaboration and Contact Center

Data Center and Cloud

Tribal Anchor Network

Hotels, Sports & Recreation

Healthcare

Education

Community & Environment
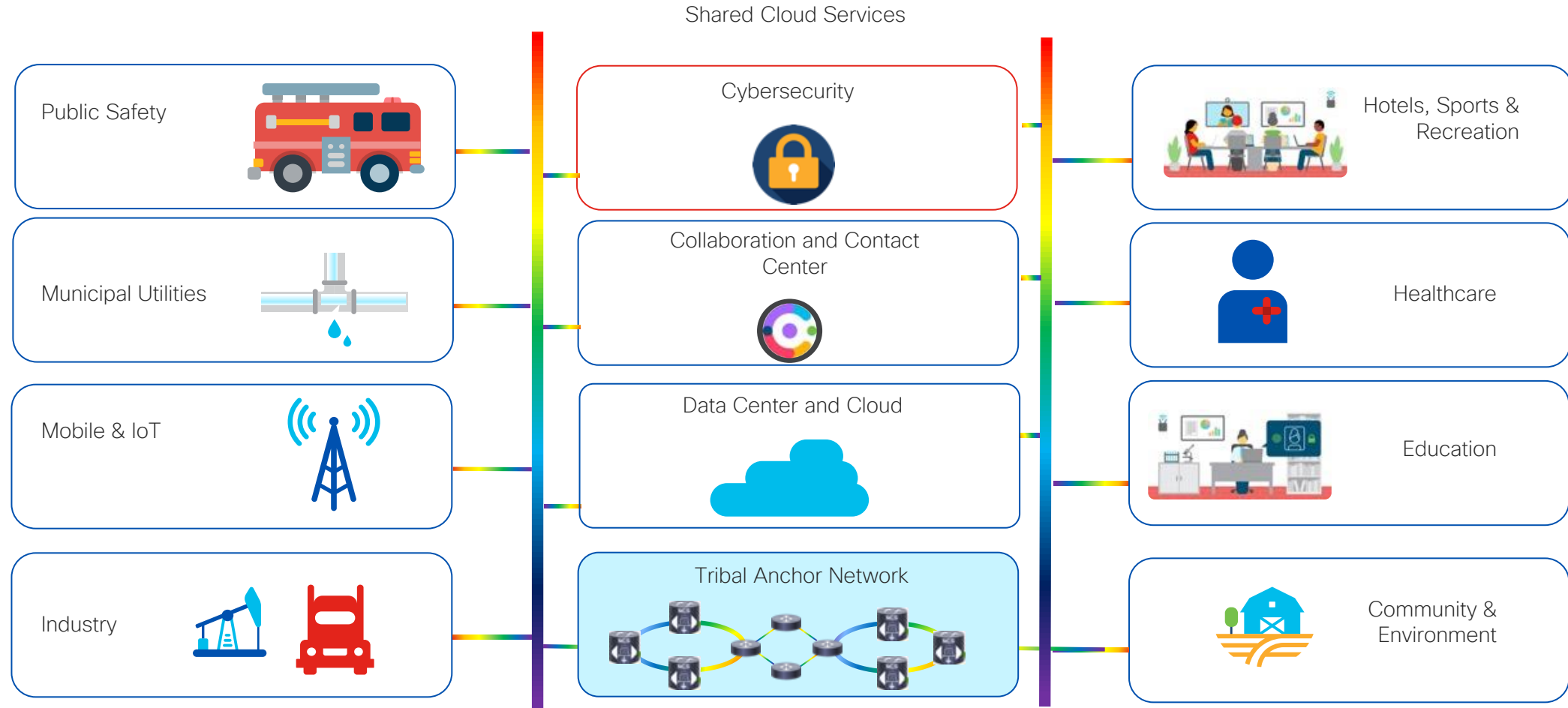
Tribal Broadband Foundation
Cisco's strategy is to simplify the network

Access Network

The Foundational Core Network

Connects Tribal Anchor Institutions & Provides Wholesale Services

Automated end to end service creation and provisioning

Safety

Tribal Government

Subscriber Management (on or off Indian Country)

Education

Peering

Healthcare

Internet

Any Access Technology

5G

Secure overlay (SD-WAN, VPN, EVPN, …)

Versatile Underlay: Cisco Routed Optical Network SDN Transport

Broadband Technologies

Examples of

Simplification
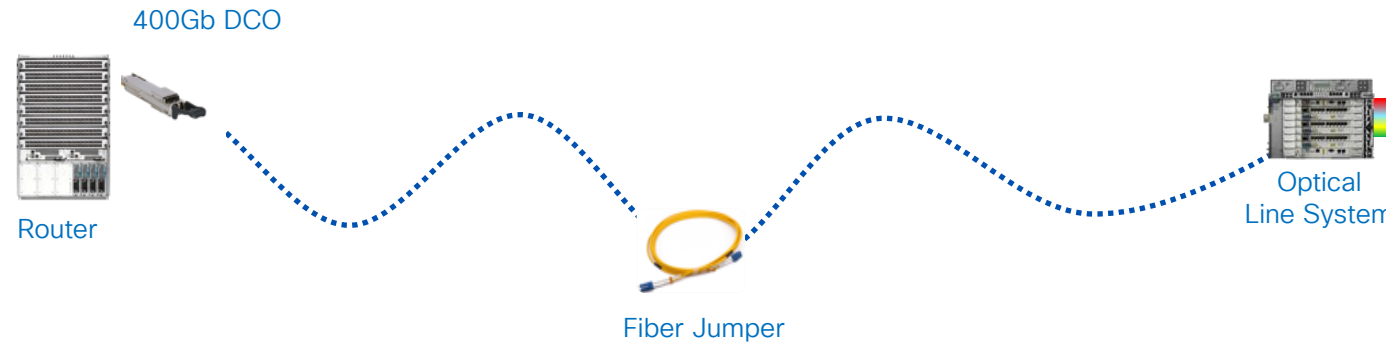
1. Convergence

2. Automation

3. Security

Simplification

Removing hardware cost and complexity

Traditional Design

SR Optic

Router

Fiber Jumper

SR Optic

Transponder/ Muxponder

Fiber Jumper

Optical Line System
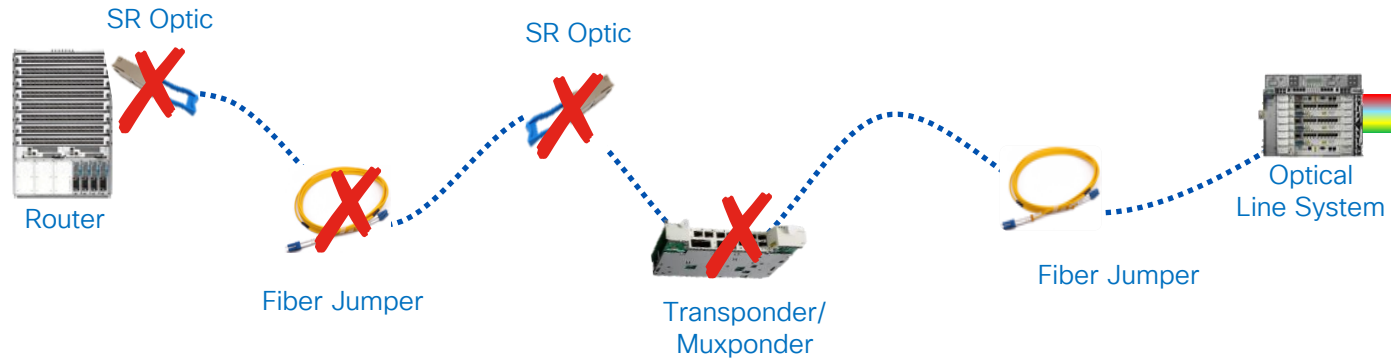
2 x SR Optics
2 x Fiber Jumpers
1 x Transponder

Routed Optical Networking

400Gb DCO

Router

Fiber Jumper

Optical Line System

1 x DCO Optic
1 x Fiber Jumper

35% — CapEx Savings*

46% — TCO Savings*

57% — OpEx Savings*

94% — Power savings vs. transponders

*Source: ACG Research, 2022

Converging the anchor network

Router   Transponder   Transponder   Router

Traditional Design

Optical Line System
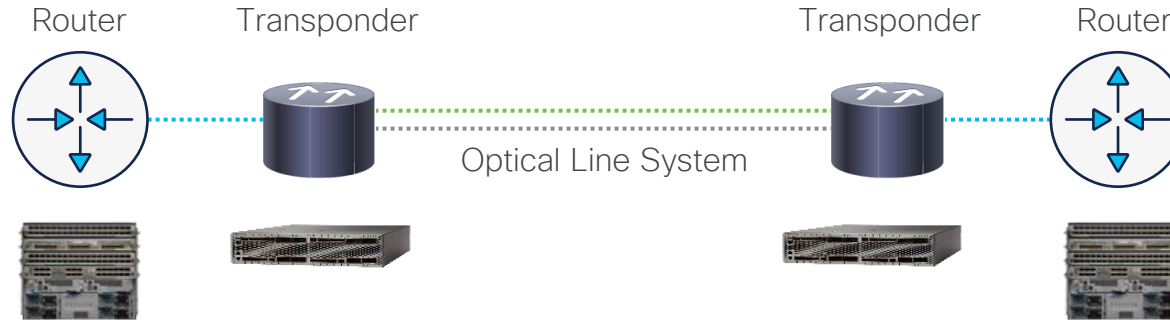
High complexity, footprint, power, latency and cost

RON Transport   RON Transport

Converged Design

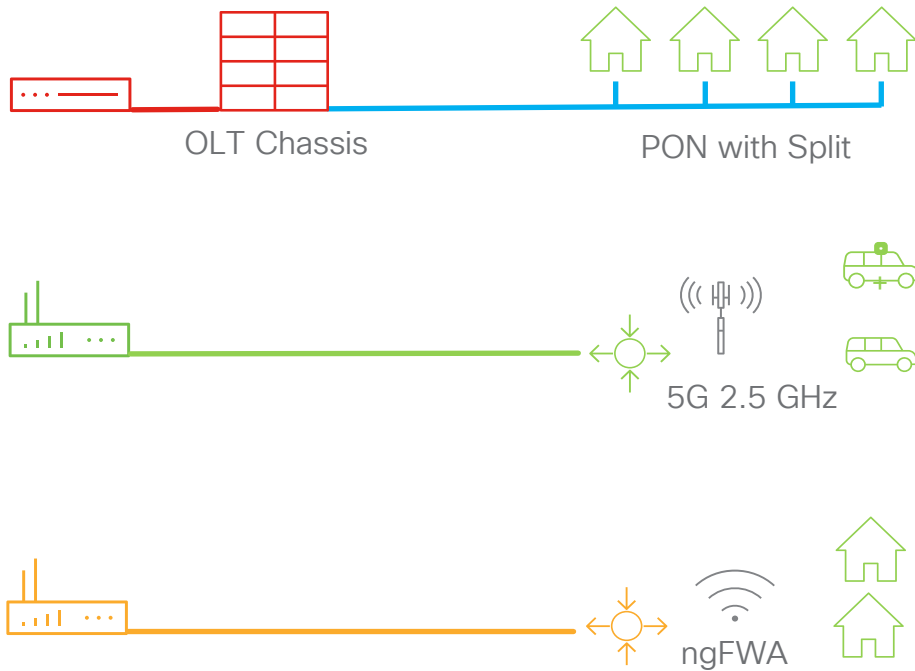Optical Line System

Router + DCO   Router + DCO
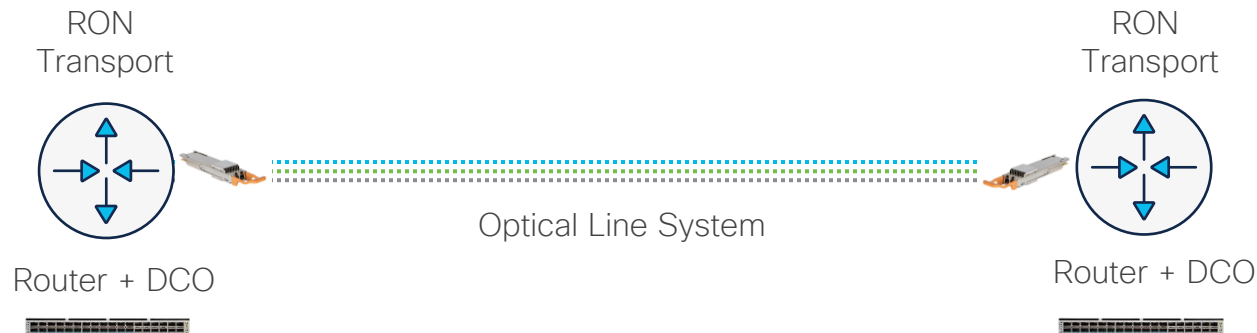
Less footprint, complexity, costs and latency

Simplification

Converging the broadband access network
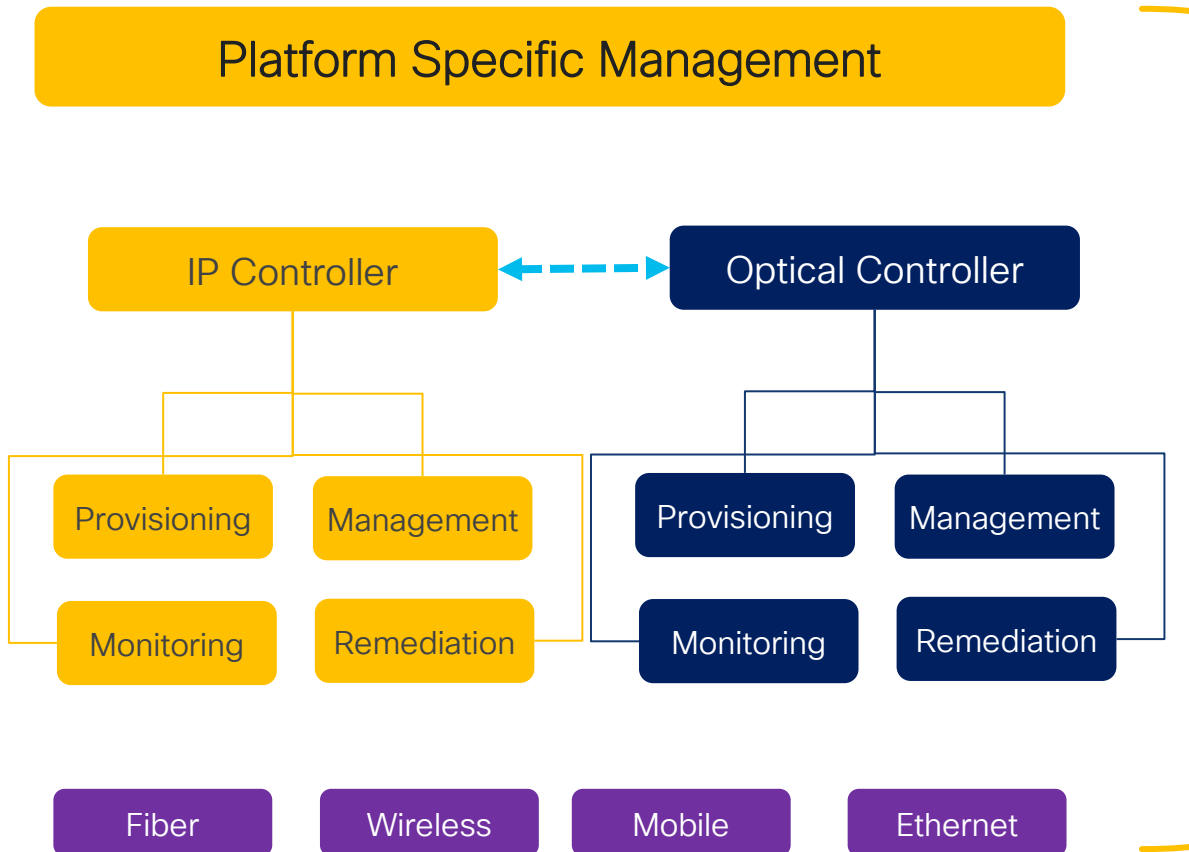
Access Specific Aggregation Platforms

OLT Chassis

PON with Split

5G 2.5 GHz

ngFWA

Aggregation of all Accesses at L3

5G 2.5 GHz

Aggregation router
NCS540

ngFWA

Active Ethernet

Tribal
Enterprises

PON with Split
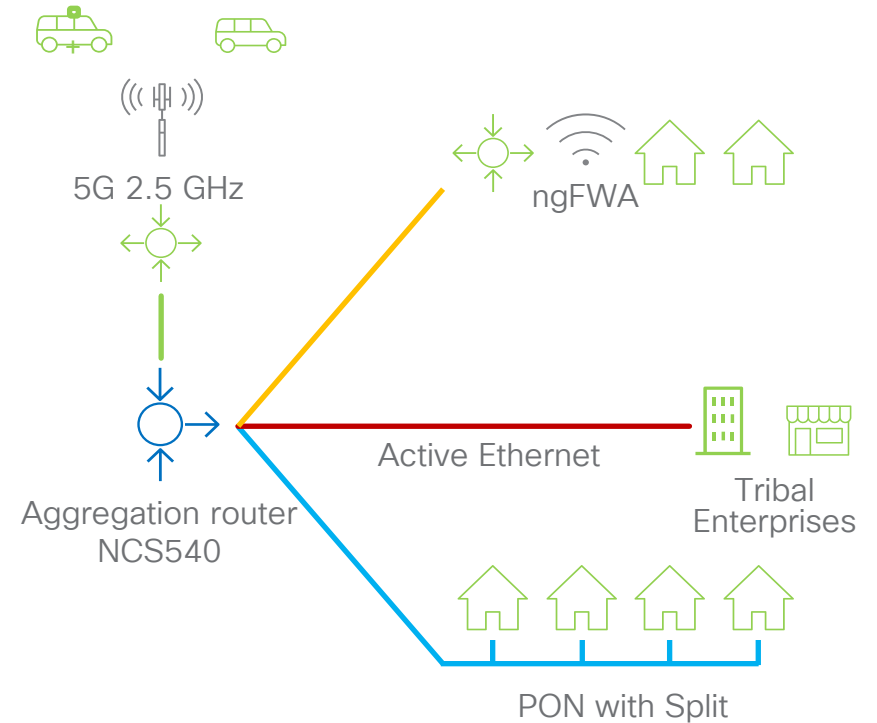
Fewer devices, easier management and improved resiliency

Simplification: Crosswork Network Controller

Managing the network

Platform Specific Management

IP Controller ⟷ Optical Controller

Provisioning Management

Monitoring Remediation

Provisioning Management

Monitoring Remediation

Fiber Wireless Mobile Ethernet

Converged Network Management

Network Controller

Provisioning Management

Monitoring Remediation
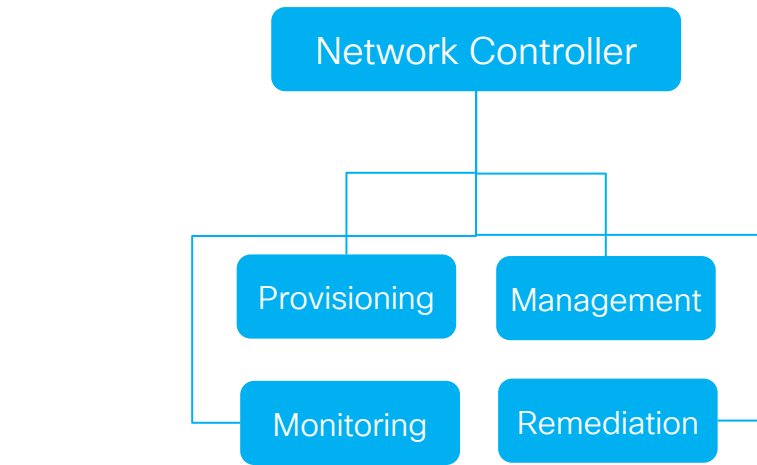
81% faster time to launch services

60% improved capital efficiency

66% better OpEx utilization

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Securing the network

Traditional Prevention of DDoS

Scrubbing device

Internet peer

Internet peer

Mobile users

At Risk Tribal Core

Residential

Commercial
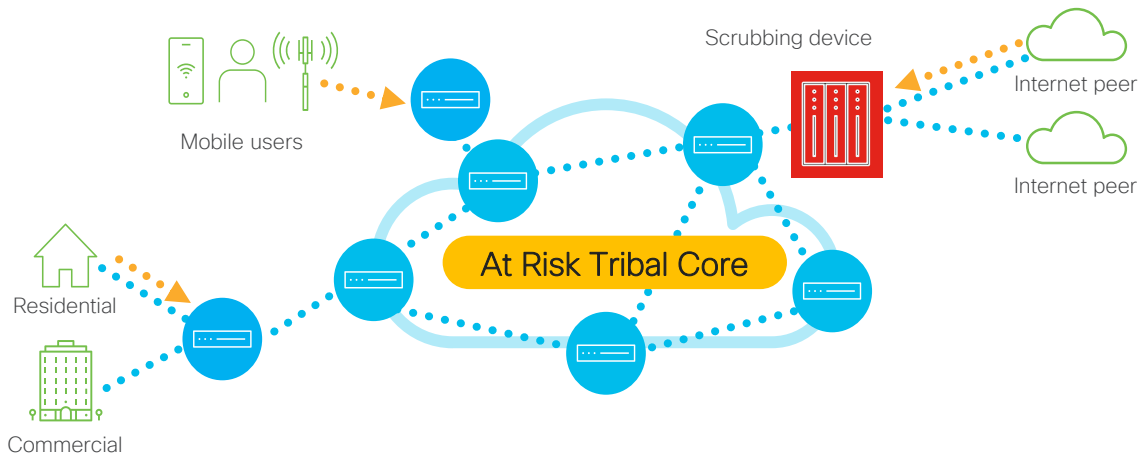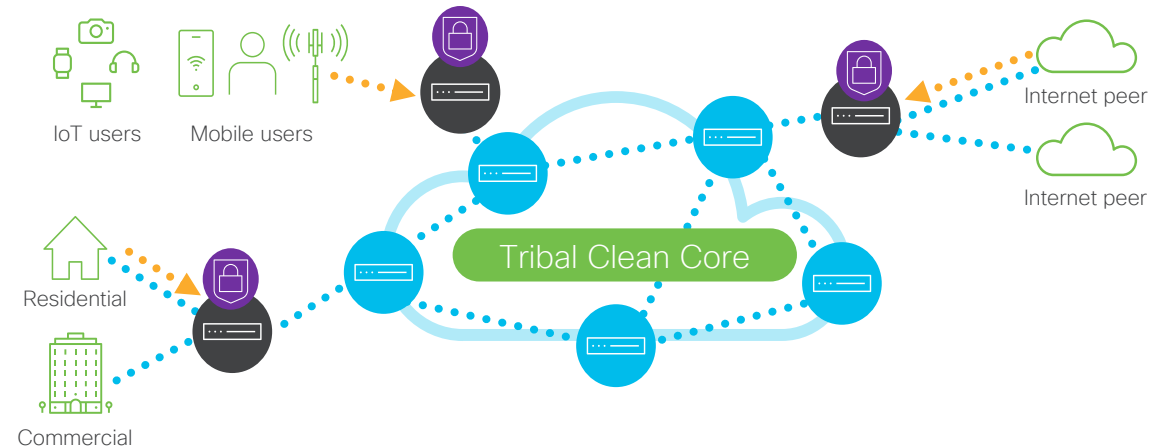
DDoS: Distributed Denial of Service

DDoS attacks are when a bad actor uses multiple devices and bots to generate traffic to overwhelm a network resource. These attacks are doubling every year with the rise in edge devices.

Edge Protect DDoS Prevention

IoT users   Mobile users

Internet peer

Internet peer

Residential

Tribal Clean Core

Commercial

🔒 World first ..DDoS protection on your router

🔒 99.5% DDoS protection efficacy

🔒 Less than 10 secs to mitigate risk across the network

Broadband Skills

NetAcad Pathways

The bridge to career possibilities for people everywhere

Sara Shreve
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Business Development Manager

Cisco Networking Academy
April 2024

Cisco Networking Academy is one of the longest-standing IT skills-to-jobs program in the world.

We provide high-quality IT courses, simulation software, and hands-on practice opportunities via our learning platform to support instructors and engage learners.

Networking Academy Curriculum Portfolio

03/08/24

Explore
Introduction to exciting opportunities in technology.

- ▲ Get Connected
- ● ▲ NDG Linux Unhatched
- ▲ Introduction to Cybersecurity
- ▲ Introduction to IoT and Digital Transformation
- ▲ Getting Started with Cisco Packet Tracer
- ▲ Exploring Networking with Cisco Packet Tracer
- ▲ Exploring IoT with Cisco Packet Tracer
- ▲ Discovering Entrepreneurship
- ▲ Managing a Business Venture
- ▲ Launching a Business Venture
- ▲ Engaging Stakeholders for Success
- ▲ Creating Compelling Reports
- ● ▲ English for IT – Part 1
- ● ▲ English for IT – Part 2

Career
Preparation for entry level positions.

Networking

- ● ▲ Networking Basics
- ● ▲ Networking Devices and Initial Configuration
- ● ▲ Network Addressing and Basic Troubleshooting
- ● ▲ Network Support & Security
- ★ ● Networking Essentials 3.0

CCNA:
- ★ ● ■ Introduction to Networks
- ★ ● ■ Switching, Routing, & Wireless Essentials
- ★ ● ■ Enterprise Networking, Security & Automation

CCNP Enterprise:
- ★ ● ■ Core Networking (ENCOR)
- ★ ● ■ Advanced Routing (ENARSI)

Programmable Infrastructure

OPENEDG
- ● ▲ Python Essentials 1
- ● ▲ Python Essentials 2

- ★ ● ■ DevNet Associate

Workshop: Experimenting with REST APIs

Workshop: Model-Driven Programmability

Cybersecurity

- ● ▲ Endpoint Security
- ● ▲ Network Defense
- ● ▲ Cyber Threat Management
- ● Cybersecurity Essentials 3.0
- ★ ● ■ CyberOps Associate
- ▲ Ethical Hacker
- ★ ■ Network Security

Partner Offered Programming

OPENEDG
- ● ▲ JavaScript Essentials 1 (JSE)
- ● ▲ JavaScript Essentials 2
- ● CLA: Programming Essentials in C
- ● CLP: Advanced Programming in C
- ● CPA: Programming Essentials in C++
- ● CPP: Advanced Programming in C++

NDG
- ● ▲ NDG Linux Essentials
- ● ▲ NDG Linux I & II

Data Science
- ▲ Introduction to Data Science
- ▲ Data Analytics Essentials
- ▲ Data Science Essentials *(Coming Soon)*

OS & IT Basics
- ★ ● IT Essentials
- ▲ Computer Hardware Basics
- ▲ Operating System Basics

- ○ Aligns to Certification/Certificate
- □ Instructor Training Required
- △ Self-paced
- ☆ ASC Alignment Required

Includes courses on NetAcad.com and SkillsForAll.com

Course Portfolio

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Networking Academy

NETWORKING

Entry-level

Network Technician Career Path

Networking Essentials v3.0

Networking Basics → Networking Devices & Initial Configuration

Network Addressing & Basic Troubleshooting → Network Support & Security

- Cisco Certified Support Technician (CCST) Networking
- Network Technician, Support Technician US Avg Salary $50K-70K

Associate-level

CCNA: Introduction to Networks → CCNA: Switching, Routing, and Wireless Essentials → CCNA: Enterprise Networking, Security, and Automation

DevNet Associate

- Cisco Certified Network Associate (CCNA)
- Network Engineer US Avg Salary $60K-100K

- Cisco Certified DevNet Associate
- DevOps Engineer US Avg Salary $110K-130K

Professional-level

CCNP Enterprise: Core Networking → CCNP Enterprise: Advanced Routing

- Cisco Certified Specialist – Enterprise Core
- Cisco Certified Specialist – Enterprise Advanced Infrastructure Implementation
- Cisco Certified Network Professional (CCNP) Enterprise
- Network Administrator US Avg Salary $88K-150K

Attract · **Develop** · **Retain**

Next Steps

Apply to Become an Academy:

https://www.netacad.com/become-an-academy

For any additional questions, reach out to:

Sara Shreve, sashreve@cisco.com

·ı|ı·ı|ı· Networking
CISCO™ Academy

Thank you,

and for ongoing support

Ongoing Cisco support

Broadband Technologies

- Internet for the Future
- Fiber / Wireless / Mobile
- Broadband Innovation Center

Broadband Solutions

- Residential & Business
- Government Services
- Education & Healthcare

Partner Ecosystem

- Prepare / Plan / Design / Delivery
- Operate / Transfer / Support
- Advisory & Technology partners

Pilots

- Country Digitization Acceleration
- Social Justice Programs through the Cisco Foundation

Skills & Training

- Cisco Networking Academy
- Cisco Certifications
- Native American Network

Funding

- Public Funding Office
- Global Infrastructure Fund
- Cisco Capital

A broadband blueprint for Native Nations

@AtLink BROADBAND & BEYOND   **CISCO**   **TARANA**

A Broadband Blueprint for Native Nations

Scan to download

High-Level
Rural Broadband
Design Guide

Contacts for follow-up

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CISCO

The bridge to possible