INNOVATE

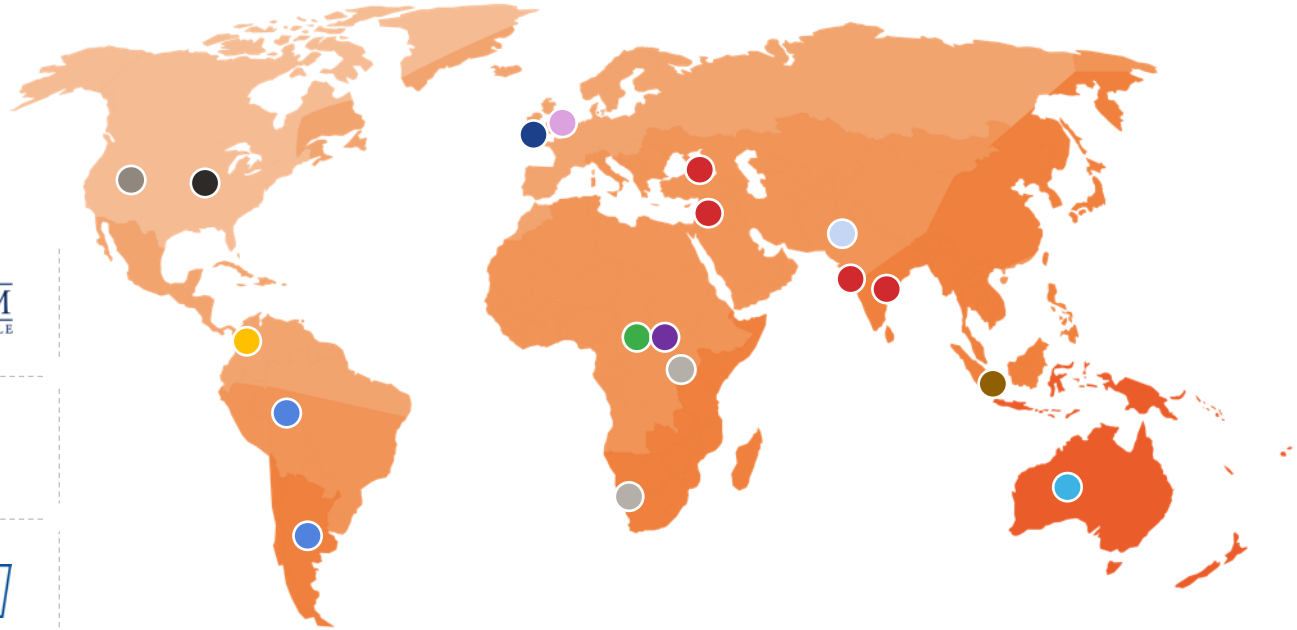
4G 5G OPEN RAN

Parallel WIRELESS

www.parallelwireless.com

PROVEN TECHNOLOGY

One Technology for ALL Gs and ALL Open RAN Use Cases



MILLICOM THE DIGITAL LIFESTYLE

BT

INLAND CELLULAR

Telefónica

MTN

vodafone

etisalat

Cellcom

orange

zain

OPTUS

ESN Emergency Services Network

Outdoor Open RAN

Network modernization for All G

- VF Turkey
- Zain
- MTN
- Orange
- Ooredoo

Coverage

- EE/BT
- Optus
- IpT
- OptimERA
- Millicom

Capacity

- Inland Cellular
- Etisalat

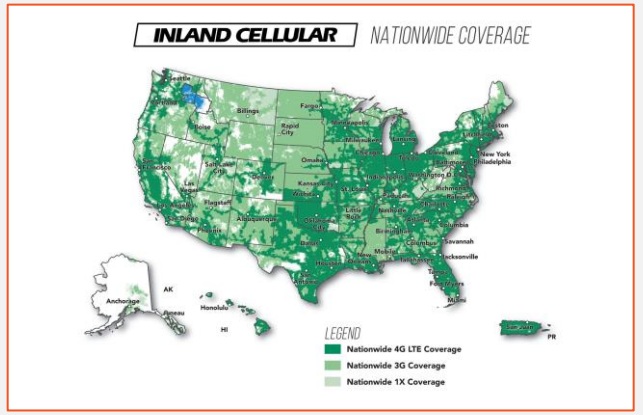
5G readiness

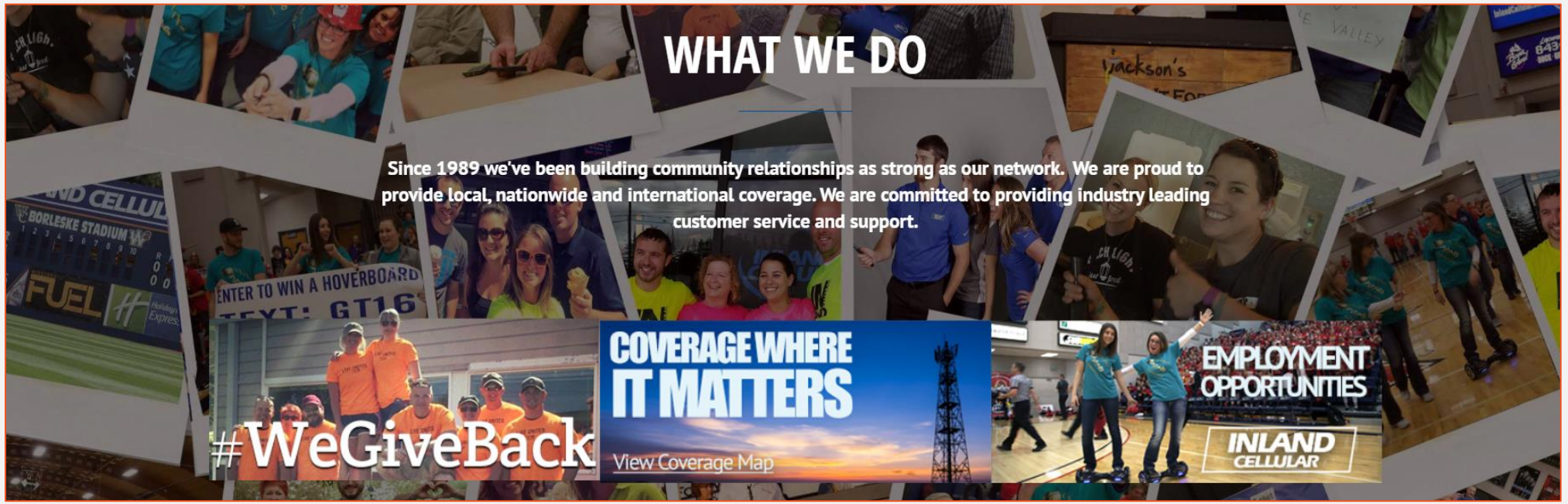
- Cellcom
- Inland Cellular

Public Safety LTE Open RAN

- ESN (UK)

INLAND CELLULAR





THE BEST HOPE FOR U.S. CHALLENGE TO HUAWEI

No Vendor Lock-In

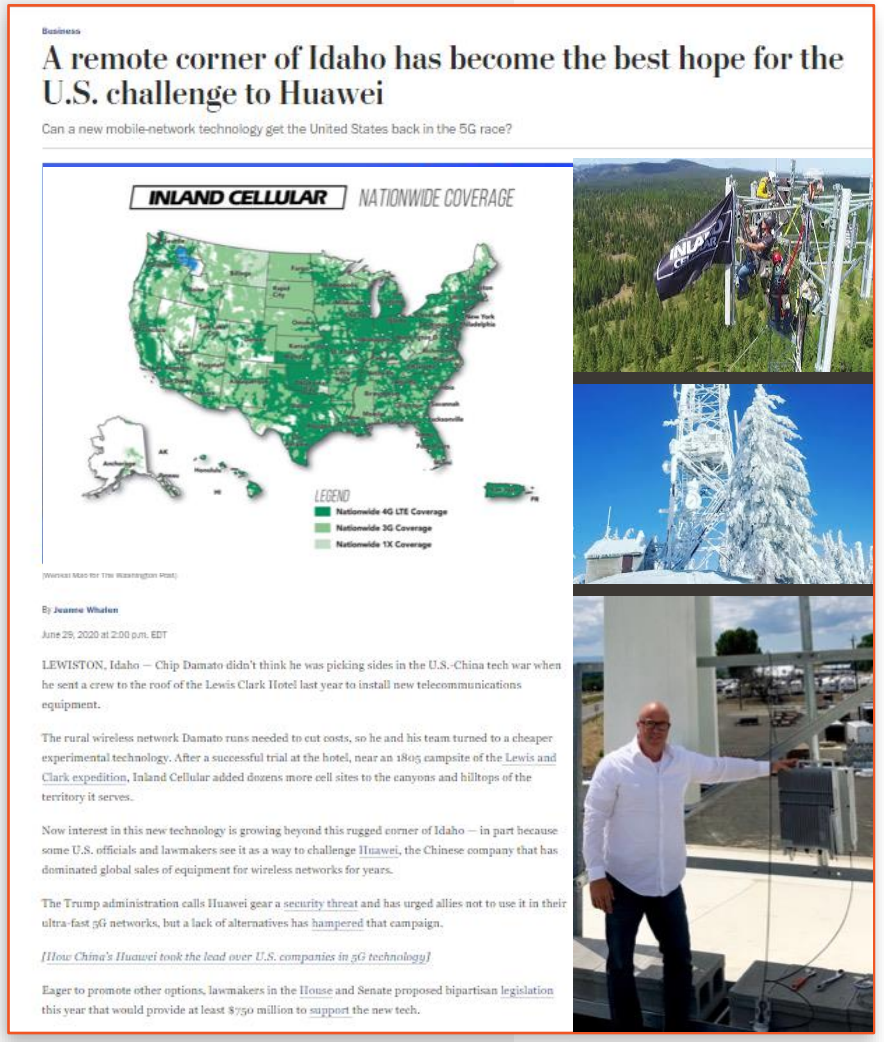
For many years, Inland Cellular used [traditional RAN vendors] equipment in their network, but they grew frustrated by incumbent vendors dictating their future. When they needed to upgrade their system or add a new feature, they had to accept [their historic vendors'] pricing because they were locked into [their historic vendors'] proprietary technology.

Lowest TCO

Open interfaces ultimately leading to cost savings was the main reason Inland Cellular turned to an Open RAN network - estimating the technology has cut the price of each cell site by 40 percent, to about $20,000. *That is an even more important consideration as telecom companies build 5G systems, which require more cells.*

Performance

The Open RAN result was impressive: The equipment transferred data more efficiently than the network's other cell sites and synced well with them.



Business

A remote corner of Idaho has become the best hope for the U.S. challenge to Huawei

Can a new mobile-network technology get the United States back in the 5G race?

By Jeanne Whalen

June 29, 2020 at 2:00 p.m. EDT

LEWISTON, Idaho — Chip Damato didn't think he was picking sides in the U.S.-China tech war when he sent a crew to the roof of the Lewis Clark Hotel last year to install new telecommunications equipment.

The rural wireless network Damato runs needed to cut costs, so he and his team turned to a cheaper experimental technology. After a successful trial at the hotel, near an 1805 campsite of the Lewis and Clark expedition, Inland Cellular added dozens more cell sites to the canyons and hilltops of the territory it serves.

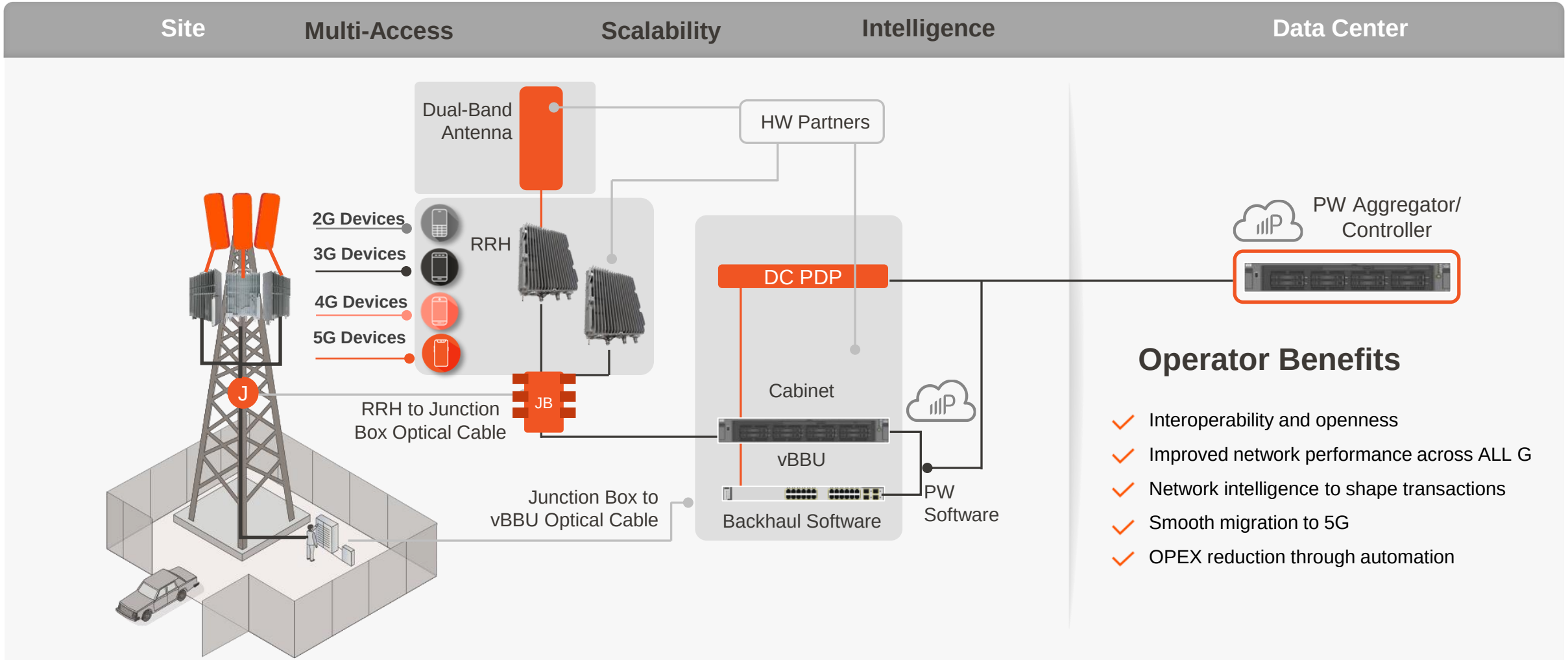
Now interest in this new technology is growing beyond this rugged corner of Idaho — in part because some U.S. officials and lawmakers see it as a way to challenge Huawei, the Chinese company that has dominated global sales of equipment for wireless networks for years.

The Trump administration calls Huawei gear a security threat and has urged allies not to use it in their ultra-fast 5G networks, but a lack of alternatives has hampered that campaign.

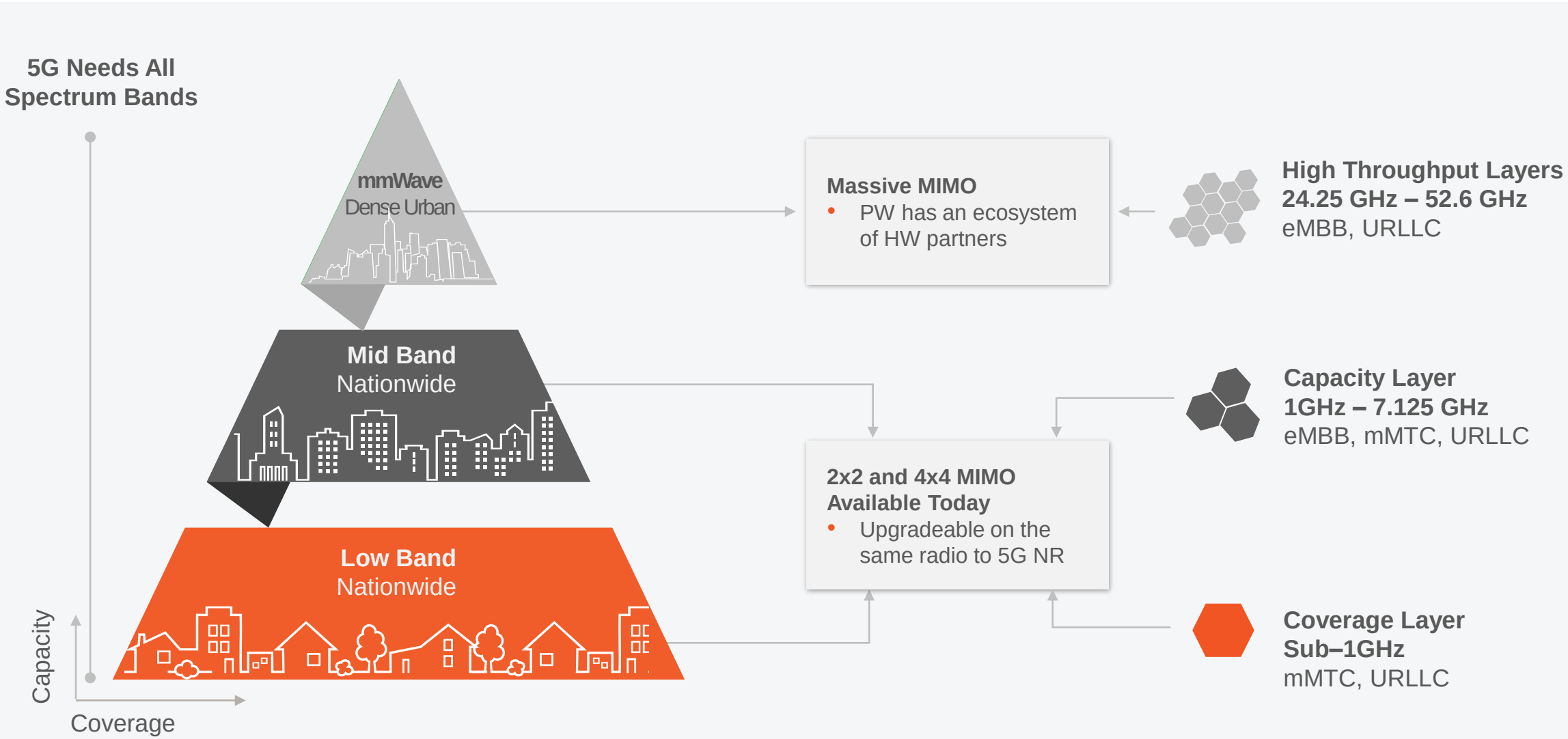
[How China's Huawei took the lead over U.S. companies in 5G technology]

Eager to promote other options, lawmakers in the House and Senate proposed bipartisan legislation this year that would provide at least $750 million to support the new tech.

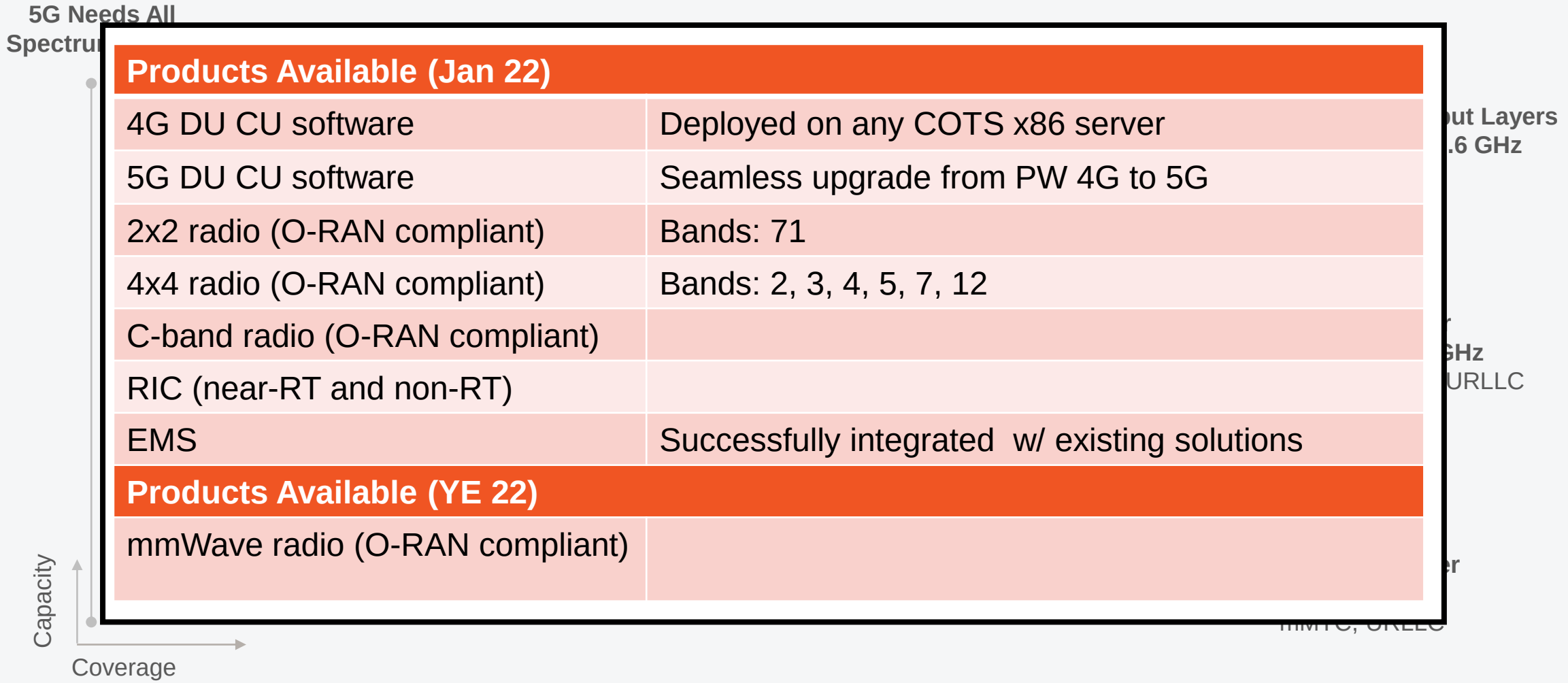
E2E ARCHITECTURE



5G SPECTRUM BANDS AND PW'S OPEN RAN



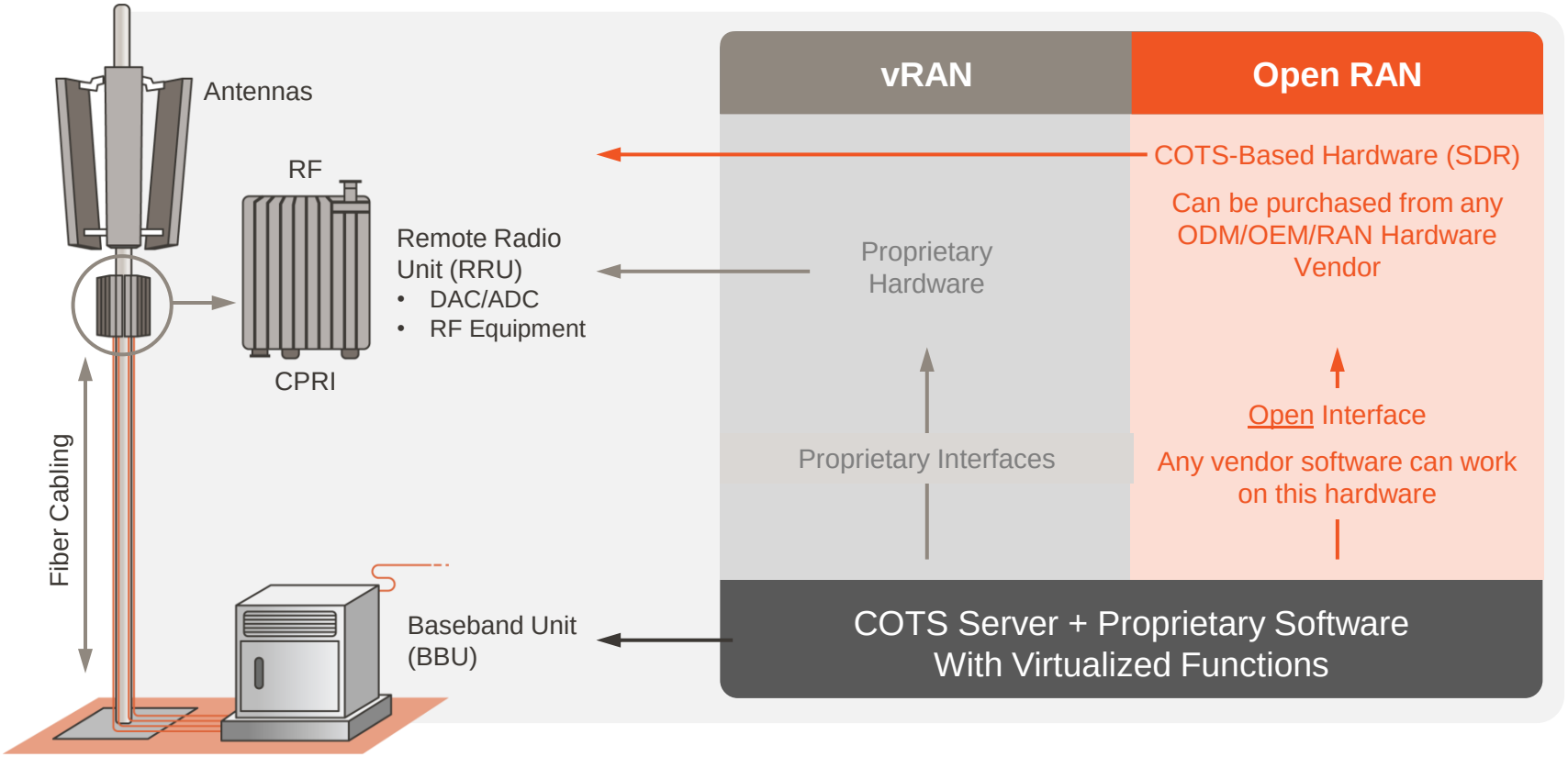
5G SPECTRUM BANDS AND PW'S OPEN RAN



Products Available (Jan 22)	
4G DU CU software	Deployed on any COTS x86 server
5G DU CU software	Seamless upgrade from PW 4G to 5G
2x2 radio (O-RAN compliant)	Bands: 71
4x4 radio (O-RAN compliant)	Bands: 2, 3, 4, 5, 7, 12
C-band radio (O-RAN compliant)	
RIC (near-RT and non-RT)	
EMS	Successfully integrated w/ existing solutions
Products Available (YE 22)	
mmWave radio (O-RAN compliant)	

OPENRAN

Disaggregating Hardware and Software



Contemporary Base Station
- Signal Processing
- Network Access
- Fiber Optic Cables

vRAN is not necessarily Open RAN

Open RAN

Is **"Virtualized Software"** – running on **– "Open Interface GPP-based Hardware"**

Anything Else is Considered Proprietary

Major Ecosystem Influencers
- O-RAN Alliance
- Telecom Infra Project
- Small Cell Forum

Softwarization of the RAN

CONTROL YOUR OWN DESTINY

PAST

- Proprietary interfaces
- Endless hardware/software dependencies
- Vendors Dictating:
  - Upgrades – HW and SW cost and choices
  - Limitations – scaling and timing of features
  - How fast we get things done – vendor dev time
  - When we get things done – vendor services only
- Constraining choice in how we grow and architect our network in our unique environment

FUTURE

- Open interfaces
- Plug and play Interoperability – both HW and SW
- Inland controls:
  - Topology
  - When we upgrade and what we get
  - CI/CD
  - Many more services options for operators
- Ultimately controlling our business plan for growth, coverage and capacity serving rural America

Competition, choice, and cost are all correlated

MARKET FORCES CAN BRING MORE CONNECTIVITY

Every network topology / context is unique

- Different technical needs for Western Oregon from Washington DC
- Different consumer needs Western Oregon from Washington DC
- Different weather, topology, etc.

Legacy vendors dictate answers versus giving us choice – ultimately dictating our business plans - we need to unshackle our work from them to deliver more for America

FCC can help by nurturing open-ness but please don't replace the vendors with another dictatorship – help us get market forces working to deliver more for America

THANK YOU

Parallel WIRELESS

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