Extending the Research Engineering Network to the Wireless Edge

Andrew Wiedlea
ESnet
Science Engagement Group

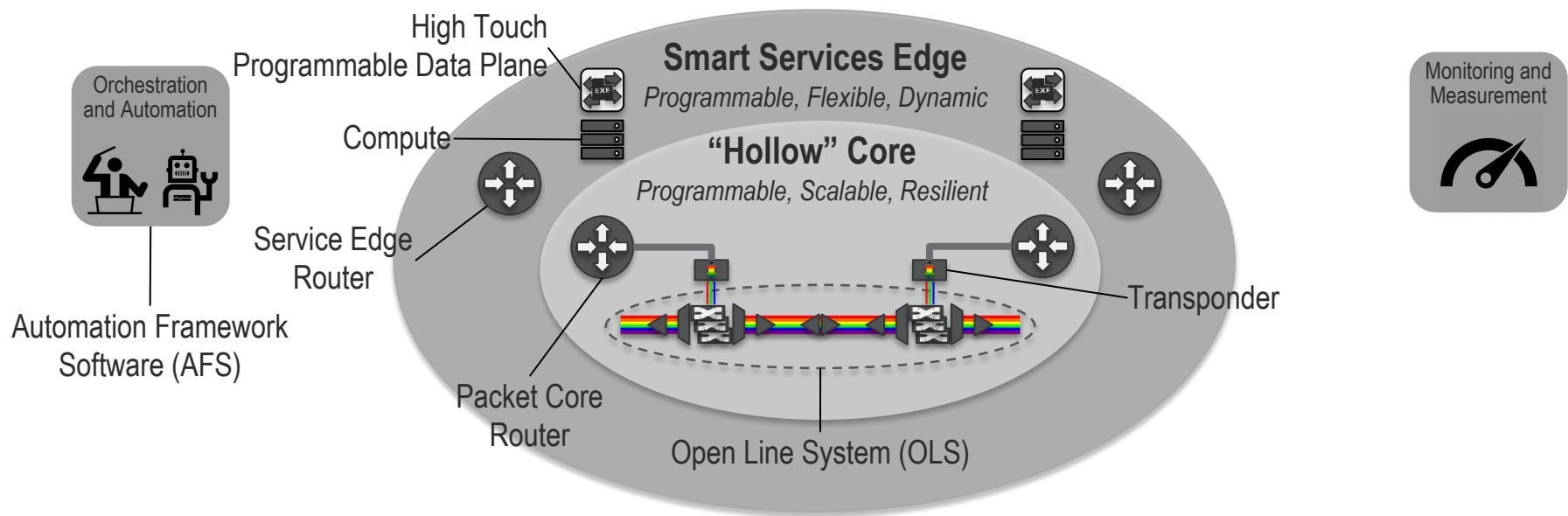# ESnet6+, beyond terrabit scale performance will be a new kind of network capability, supported by a Smart Services Edge

Orchestration and Automation

Automation Framework Software (AFS)

High Touch Programmable Data Plane

Compute

Service Edge Router

Packet Core Router

Smart Services Edge
Programmable, Flexible, Dynamic

"Hollow" Core
Programmable, Scalable, Resilient

Transponder

Open Line System (OLS)

Monitoring and Measurement

ESnet

Enable Science at the Wireless Edge: a multi-faceted problem

Challenges: all three have to be solved simultaneously, current focus is often just the first two.

❖ Locating compute resources? (edge, elsewhere)

❖ Data analytics & workflows (ML, dynamic sampling, etc)

❖ Wireless connectivity for science → how does this work as part of the entire REN stack for scientific data movement?
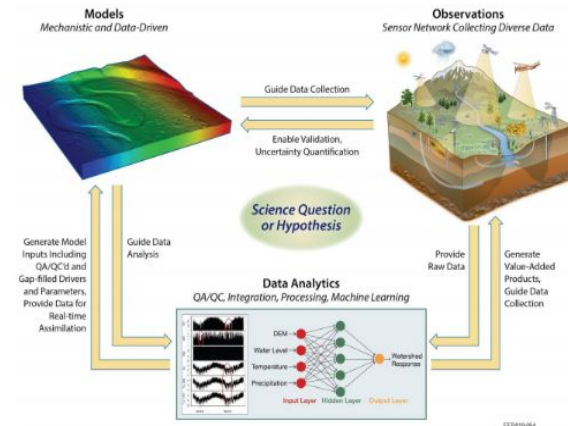
Varadharajan, Charuleka, Deborah A. Agarwal, Wendy Brown, Madison Burrus, Rosemary W. H. Carroll, Danielle S. Christianson, Baptiste Dafflon, et al. 2019. "Challenges in Building an End-to-End System for Acquisition, Management, and Integration of Diverse Data From Sensor Networks in Watersheds: Lessons From a Mountainous Community Observatory in East River, Colorado." *IEEE Access* 7: 182796–813.
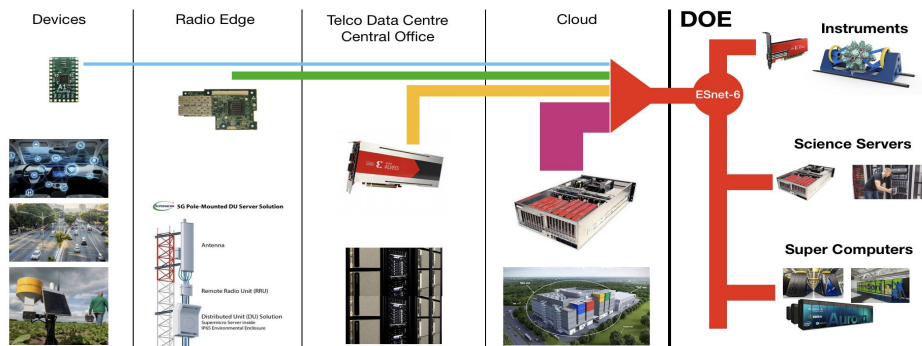

Diagram courtesy of Yatish Kumar, Chin Guok, John Shalf, LBL/ESnet, and Gordon, Xilinx

Experimentation to bridge the wireless gap...seamless performance to the sensor