

Toward a Network Telemetry Framework

[draft-song-ntf-02](#)

Haoyu Song, Tianran Zhou, Zhenbin Li (Huawei)

Giuseppe Fioccola (Telecom Italia)

Zhenqiang Li (China Mobile)

Pedro Martinez-Julia (NICT)

Laurent Ciavaglia (Nokia)

Aijun Wang (China Telecom)

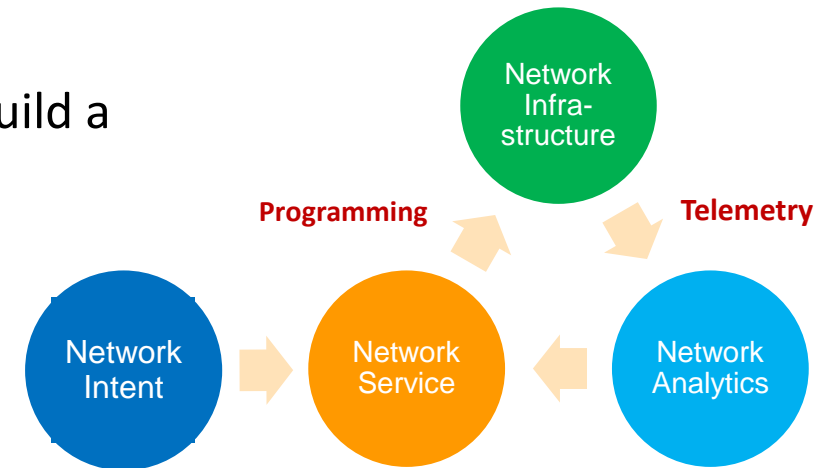
Challenges of Today's Networks

- Networks become more and more complex
 - Cloud, 5G, IoT, overlay, underlay, VPN, slicing, ...
- Applications are sensitive to network performance
 - Bandwidth, latency, jitter, packet drop, network churn, ...
- Network visibility is important for
 - Network OAM
 - Network Provision
 - Network Planning
 - Network Security
 - Network Troubleshooting
- Yet our old tools for network visibilities are outdated
 - Lack of application level visibility
 - Lack of automation tools



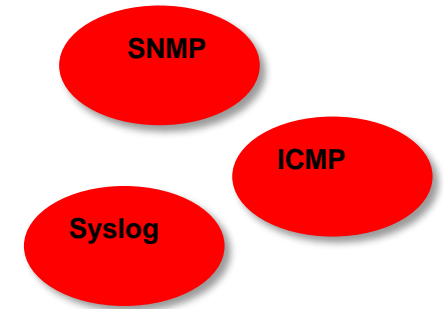
Challenges of the Future Networks

- Network management and service evolve to become intent-driven and automatic
 - Reduce human labor
 - Improve agility and performance
 - Optimize resource efficiency
- Network visibility through telemetry is pivotal to realize intent-driven autonomous networks
 - Telemetry can provide rich, reliable and real-time data, and build a close-loop network service management system.
 - Telemetry should be promoted as a first class citizen in network technologies and protocols
 - Telemetry work should be better unified, consolidated, and integrated to support the future networks

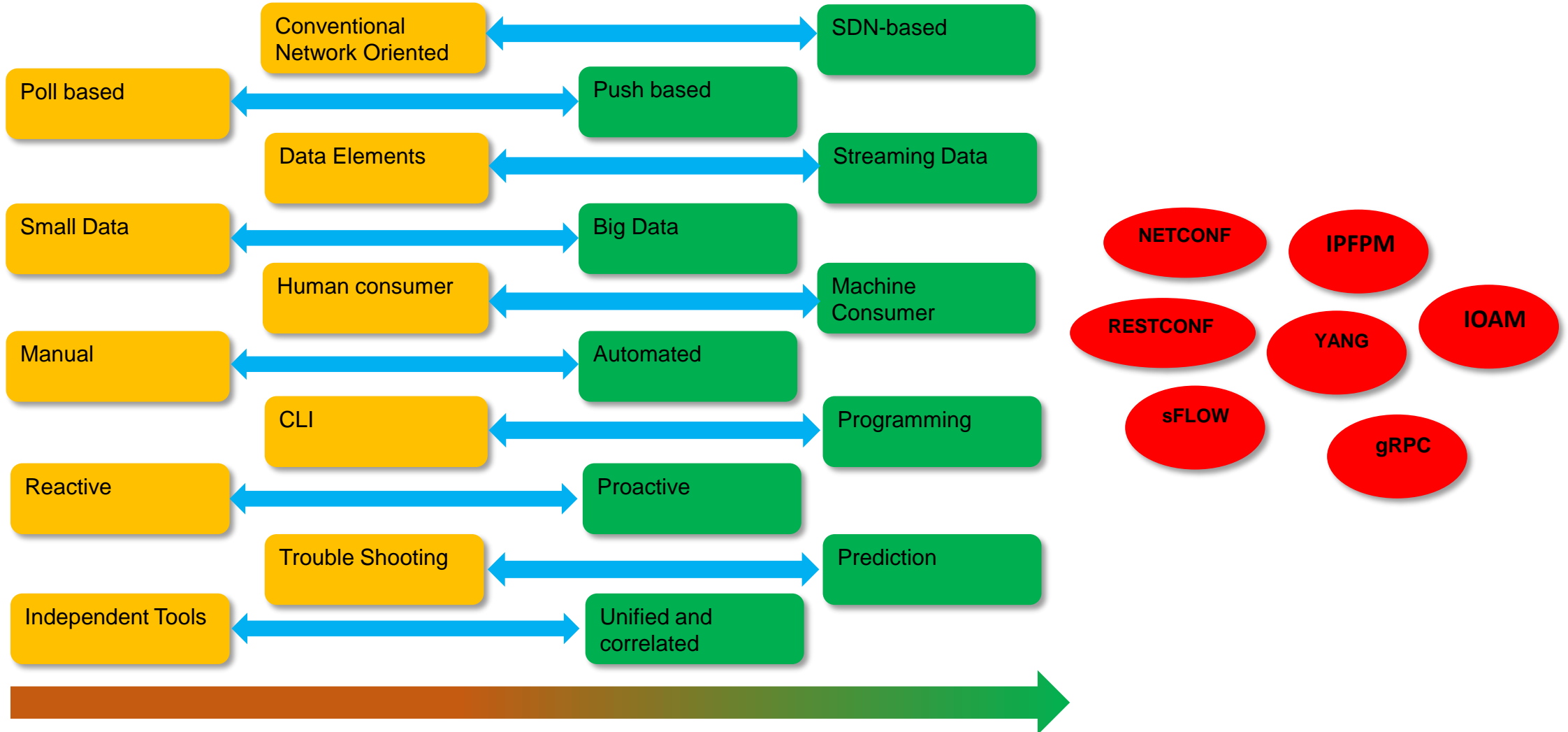


Current Solution: Network OAM

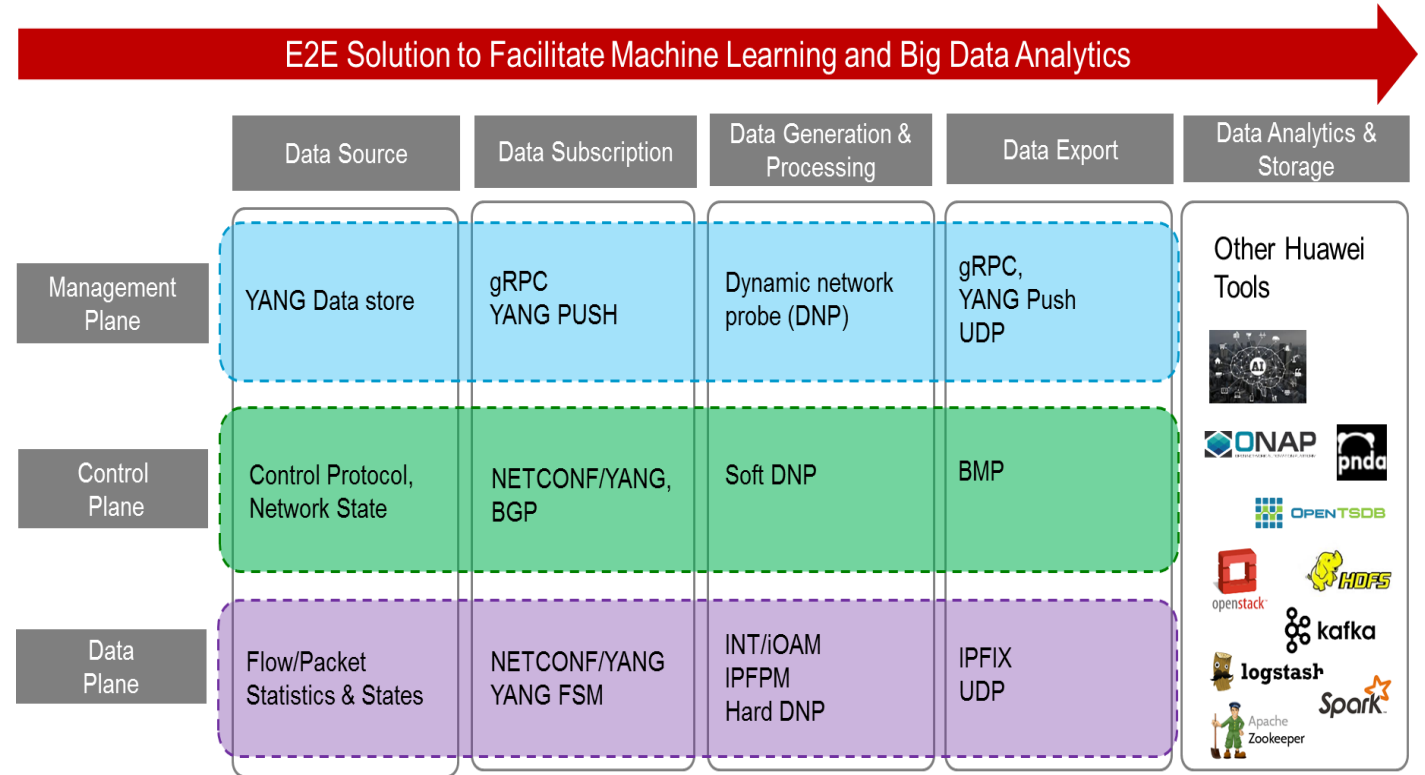
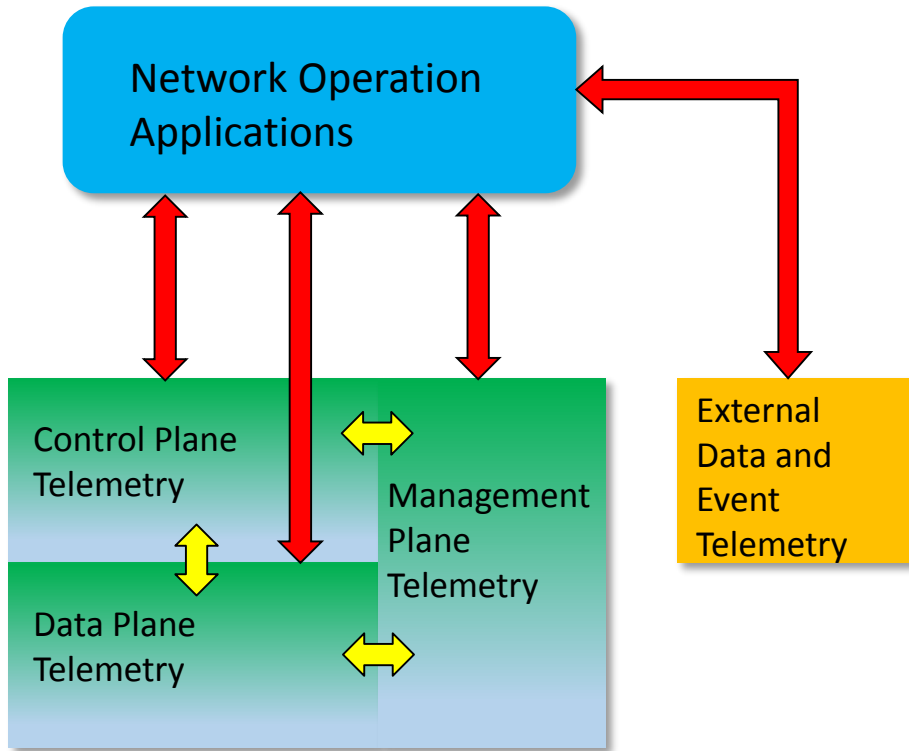
- Conventional OAM is inefficient and insufficient to sustain future autonomous networks
 - SNMP is based on low frequent polling and CLI
 - Lack of coverage, timeliness, and accuracy
- Existing OAM mechanisms are disaggregated
 - Piecemeal vertical solutions are hard to be composed into a cohesive one
 - Repetitive and redundant work, lack of collaboration and consolidation
 - Designed as afterthought patches and on a case-by-case basis, lack of holistic and systematic view
- A new brood of technologies is expected
 - A framework is needed to normalize the concepts, terms, and technology/standard developments
 - Telemetry to replace OAM as the standard term to achieve network visibility



Conventional Network OAM vs. Network Telemetry



Network Telemetry Framework (NTF)



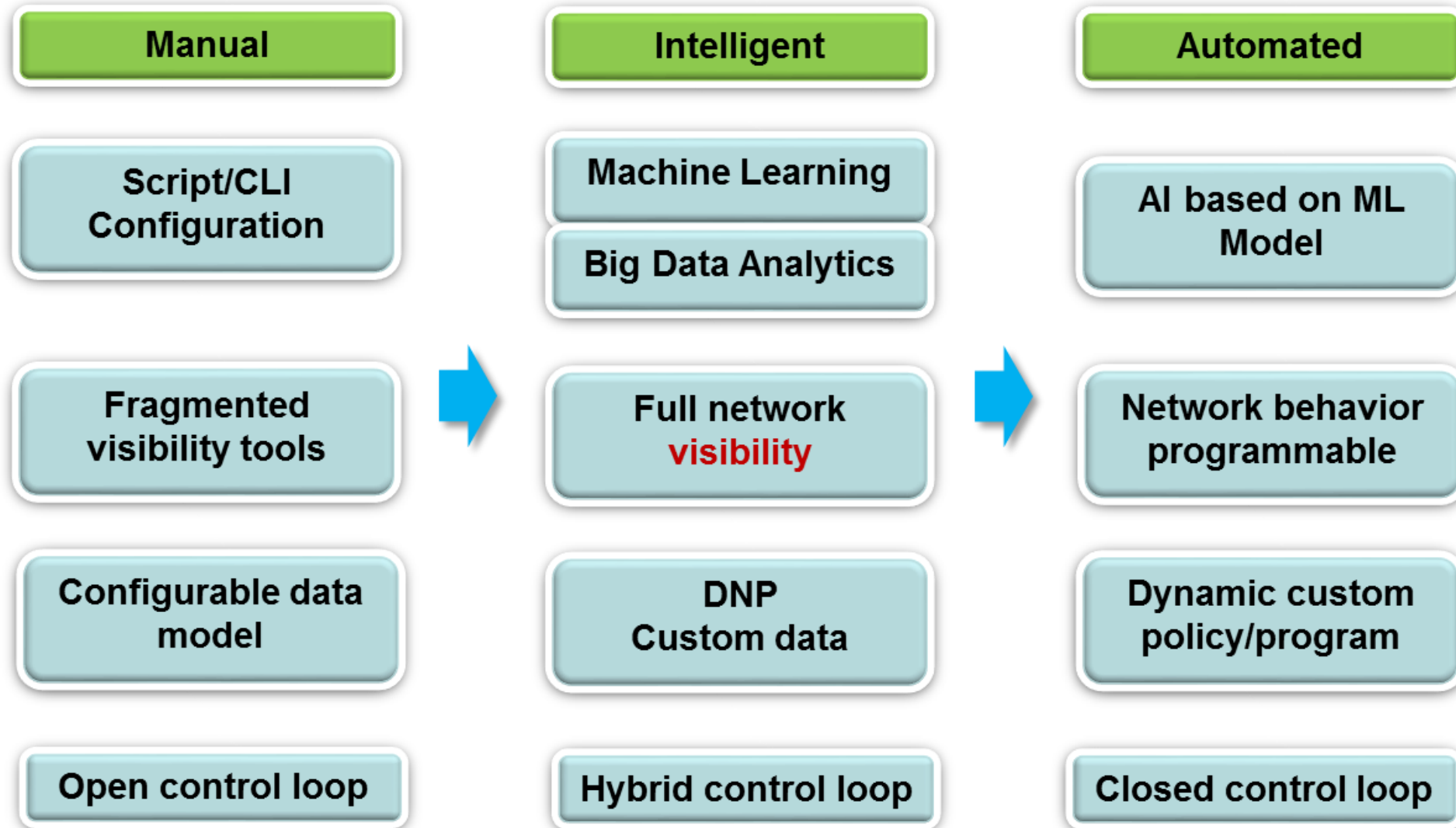
Telemetry Use Cases

- Intent and Policy Verification
- SLA Compliance Verification
- Root Cause Analysis
- Traffic Engineering and Network Planning
- Event Tracking and Prediction

Challenges of Network Telemetry

- Dynamics
 - Continuous, real-time, and interactive
- Multiple sources
 - In device, in network, and out of network
 - Passive, active, and hybrid
- Performance impact
 - Bandwidth and latency
 - Data retention
 - Observer effect

Telemetry as Cornerstone for Future Autonomous Network



Recap & Conclusion

- Promote the significance of telemetry work in IETF
 - Keep the big picture in mind (Intent-Driven Autonomous Network)
 - Make IETF the leading SDO in this area
- Formalize the telemetry-related terms and technology classification in IETF
 - Network measurement, troubleshooting, and monitoring are all data oriented and serve for the network visibility
 - Consolidate existing work
 - Guide future work
- Call for collaboration from operators and vendors