

# Toward a Network Telemetry Framework

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

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# What's new

- New co-authors: Giuseppe Fioccola (Telecom Italia), Zhenqiang Li (China Mobile), Pedro Martinez-Julia (NICT), Laurent Ciavaglia (Nokia) and Aijun Wang (China Telecom)
- Clearer definition and characteristics summary of network telemetry
  - Clear distinction between conventional OAM and telemetry
- New module for the framework: External data and event telemetry
- New content for Control Plane Telemetry: identify the requirements and challenges in details. BMP extensions are identified as NMP (Network monitoring Protocol)
- New content for Data Plane Telemetry:
  - Technique Classification: Active and Passive, In-Band and Out-of-Band, E2E and In-Network, Flow-Path-Node
  - New technology: IPFPM alternately mark for point-to-point and multipoint-to-multipoint

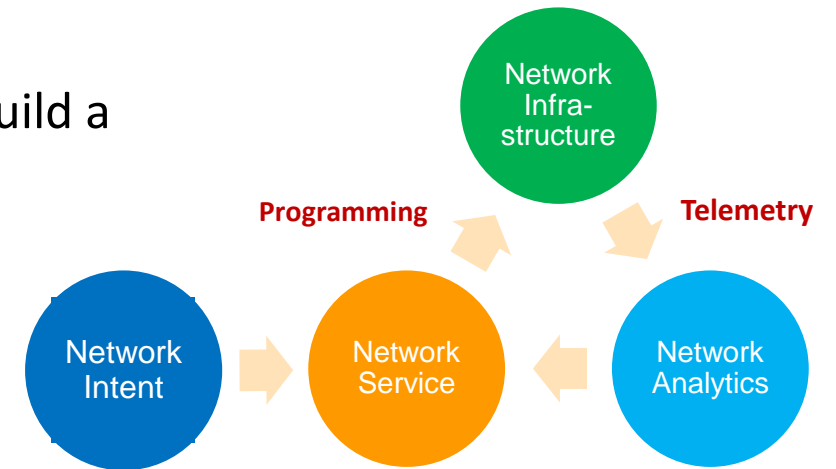
# Challenges of Today's Networks

- 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- Yet our old tools for network visibilities are outdated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



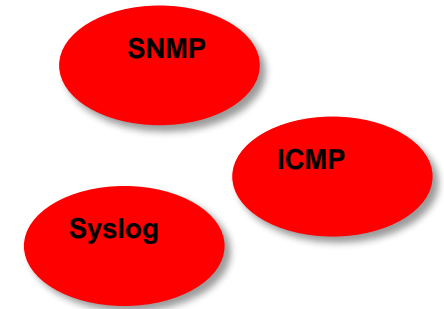
# Challenges of the Future Networks

- 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

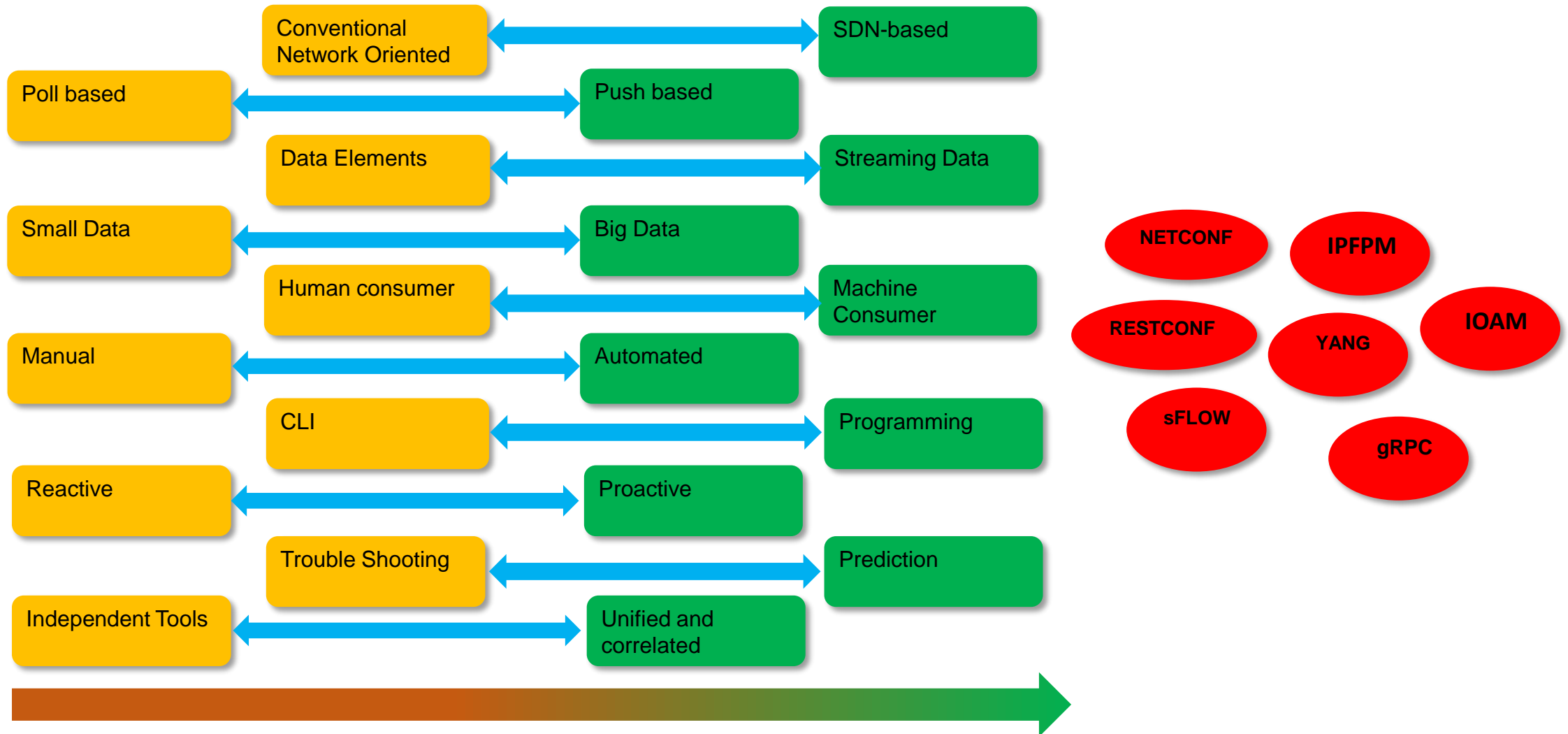


# Current Solution: Network OAM

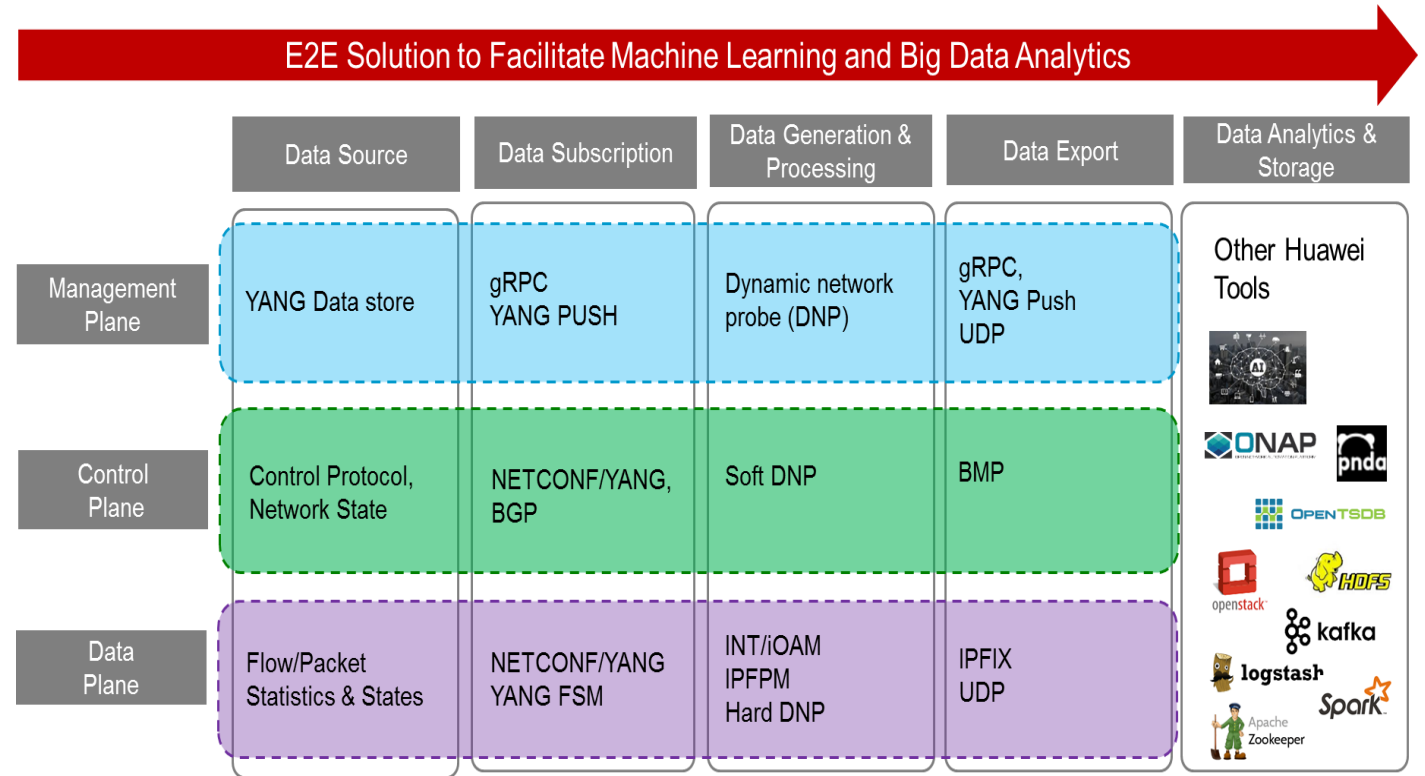
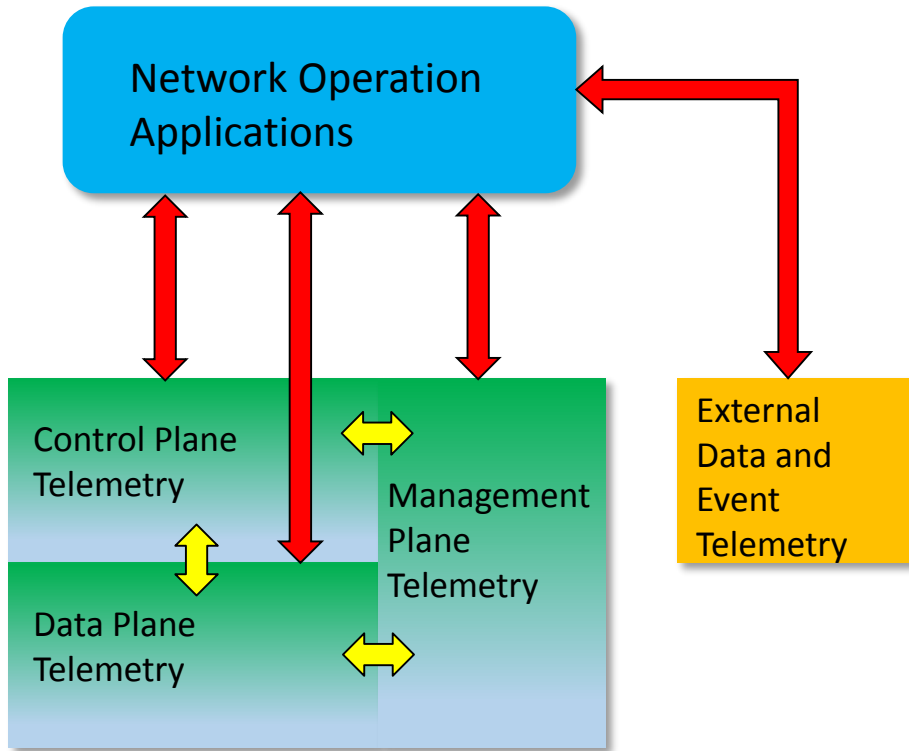
- Conventional OAM is inefficient and insufficient to sustain future autonomous networks
  - SNMP is based on low frequent polling and CLI
  - Lack of coverage, timeliness, and accuracy
- Existing OAM mechanisms are disaggregated
  - Piecemeal vertical solutions are hard to be composed into a cohesive 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

# 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