07 June 2022

The Standards People

IEEE Project TeamUp 5G

3rd training on
Standardization and
Workshop on Testbeds and
Visible Light Communications

Standardization Process within ETSI
Benefits for Operators

Presented by:

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Agenda

- A Telecom Marketplace Analysis: The need for Network Transformation
  - Technology Evolution
  - Network Automation
  - The need for standards
  - Example of a strategy and analysis for network transformation provided by the ex-President of the TMF
  - The 10 Digital Transformation journeys
- Analysis of the delivering Process for Standardization docs inside an SDO (ETSI)
  - The development of standards process
    - Traditional approach: Lifecycle States of a Standardization Process
    - An alternative approach: DevOps
- An overview of CTI services
- Benefits from the operator point of view

A Telecom Marketplace Analysis: The need for Network Transformation Technology Evolution (1)

- ⇨ Over the last two decades' enormous transitions have been made for the end user experience from dedicated voice and text mobile telephony, utilizing international standards.
- ⇨ This was achieved by migration from company propriety operating systems to a global open software market for tablets and smart phones, and user customization of data services based on a reliable market for apps.
- ⇨ The near future promises significant automation gains across markets, including automobile travel and automation using communications.
- ⇨ We see the rise of improved driving features and the use of communications technology whilst traveling.
- ⇨ With automated vehicles, the use of smart on-board technology, greater access to the internet and app market the opportunity for convergence appears.
- ⇨ The expectation of Internet of Things (IoT) and reliable self-driving vehicles is not very far away.

Source: ETSI ENI White Papers,
https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp22_ENI_FINAL.pdf
http://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp44_ENI_FINAL.pdf

A Telecom Marketplace Analysis: The need for Network Transformation Technology Evolution (2)

⇨Where is the network going?

- The traditional networks are still greatly in evidence, i.e. we see signs of Software Defined Network (SDN) effectiveness and the promise of Network Functionality Virtualisation (NFV).
- These two technology domains will be further strengthened with orchestration and componentization; however, the open equipment and network management revolution is still anticipated.
- Intelligent network management and re-configuration may be expected, in particular due to the increased dynamicity of the evolution of the network as well as the end users.
- Freedom for operators to enter policy intent and allow the network to configure, optimise and run to the best of its efficiency is in many cases a dream.
- **Conclusion:** A key pain point when operating communication equipment is the need for man-machine interaction. The complex experience, human-dependent decision, and complex manual configuration, result in low resource utilization and delays in deployment.

Source: ETSI ENI White Papers,
https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp22_ENI_FINAL.pdf
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A Telecom Marketplace Analysis: The need for Network Transformation Technology Evolution (3)

⇨The need for network transformation (1)

- Network transformation is rooted at the various *digital transformations* other industries are facing, but in the network case we are talking about a much deeper change, as the process is focused on changing the very nature of the network infrastructure itself.
- It naturally implies a serious and profound change in network management mechanisms.
- Traditional network management was done in a silo-oriented way (fixed, mobile…) with very limited automated interaction among those management silos. The automated management of services was out of scope as well.
- Service has been considered basically from a commercial view, focused on what customers are expected to consume, without incorporating network technical requirements into a holistic network service concept.

Source: ETSI ENI White Papers,
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A Telecom Marketplace Analysis: The need for Network Transformation Technology Evolution (4)

⇨The need for network transformation (2)

- The split between hardware, software and the consideration of service management from an exclusive commercial point of view, as discussed above, did not allow the required integral approach to achieve automation.
- The classical management of networks (what we could call the *old OSS*) is not able to support network transformation from a management point of view. A transformation from the old world of OSS into a modern, autonomous network management environment is required.
- This goal can be achieved if the split between what we could call the “OSS plane” and the network plane disappears.
- The integration of dynamic, intelligent and close network telemetry, the application of closed-loop control techniques, and the use of AI techniques open new ways for management.
- It is important that the application of these technologies is done with the foundation of a common vision and a consistent technology framework.

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https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp22_ENI_FINAL.pdf
http://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp44_ENI_FINAL.pdf

A Telecom Marketplace Analysis:

The need for Network Transformation

An example of a strategy and analysis for network transformation provided by the ex-President of the TMF (1)

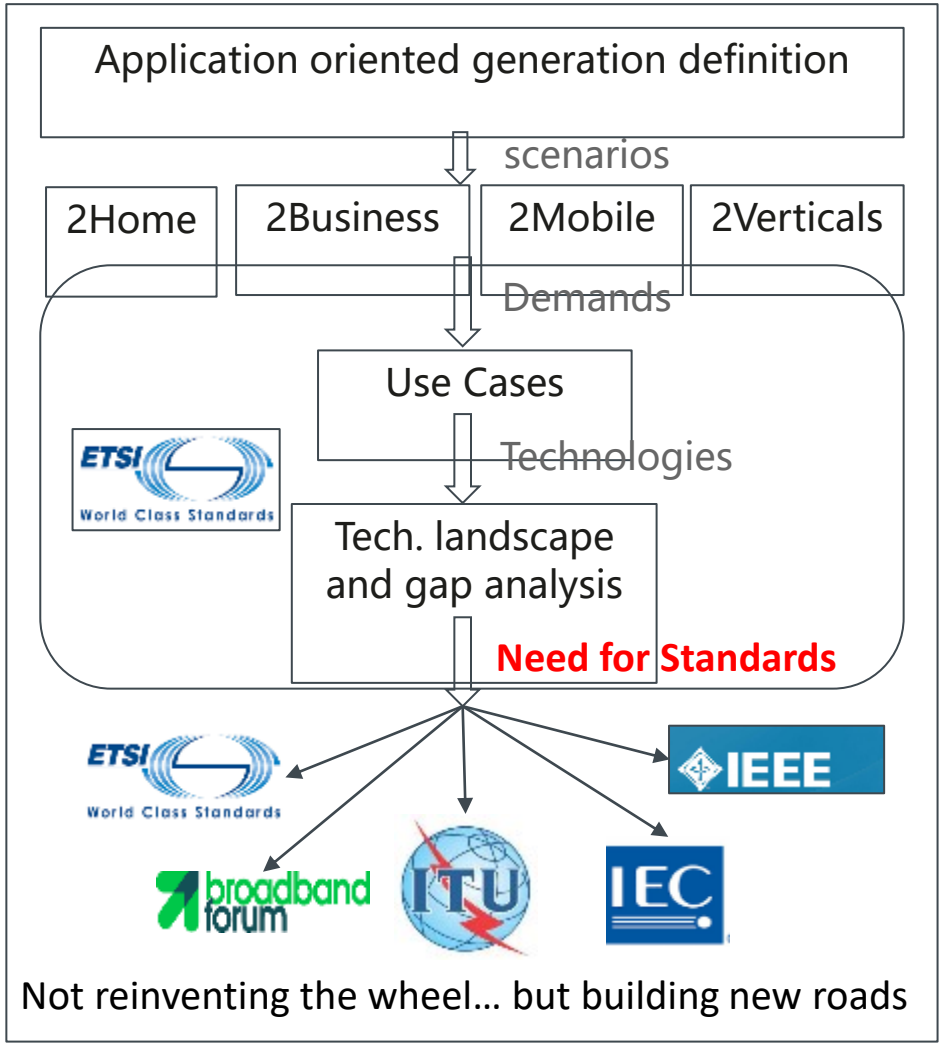
1. **The autonomously managed infrastructure journey**
2. **Becoming a security-centric telco**
3. **Becoming a data centric Telco**
4. **Creating an Open API platform**
5. **Developing a diverse digital service platform**
6. **Managing a digital partner ecosystem**
7. **Operating new business models**

The choice of business model determines the success or failure of the organization plain and simple. This journey explores how a firm's business model is defined by how it creates value for its customers, and by how it captures value. It also examines the business ability to adjust business model as the market requires.

8. **Developing a digital organization & culture**
9. **The multi-channel strategy journey**
10. **The 360 degrees omni-channel CEM journey**

A Telecom Marketplace Analysis:
The need for Standards

⇨ **What can we expect from all these new use cases and scenarios that are aggregated to the network now-a-days?**



Traditional approach: Lifecycle States of a Standardization Process

⇨ Status expected from a Work Item progress during its lifecycle:

- Work Item Description (WID) process approval
- Start of work
- Early draft
- Stable draft (possible first EditHelp review)
- Final draft for WG approval
- Final draft for ISG/TB approval
- Final EditHelp review
- Publication process

❖ Principal drawback: Too much time consuming especially now-a-days where time to market is crucial…

Alternative approach: Development and Operation (DevOps) (1)

⇨ What is DevOps?

DevOps is a cultural shift that requires vision, planning, executive buy-in, and tight collaboration to successfully establish a more integrated way of developing and delivering applications.

By embracing a few fundamental practices, teams can improve their efficiency and develop a deeper understanding of their workflows, toolsets, and processes so they can release better software faster.

Because DevOps is a continuum, these practices should also be continuous and ongoing.

Alternative approach: Development and Operation (DevOps) (2)

⇨ Open source commitment by several players in the market landscape

⇨ DevOps fundaments

⇨ Continuous integration

⇨ Strategies for adopting Open Source

Operational and business support systems (OSS/BSS) or whatever the reimagined architecture will be called someday soon, will be an automated affair.

The only uncertainty about this is whether automation will be driven by AI, open source, cloud or all of the above.

⇨ TMForum Open Digital Architecture

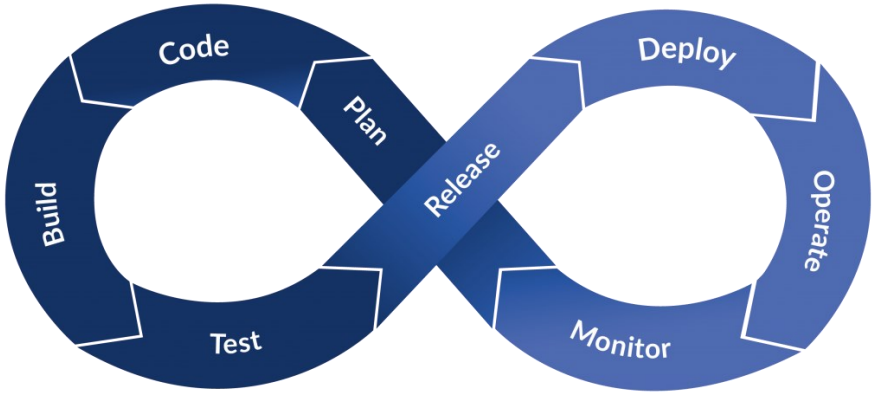
CSPs and their suppliers are collaborating to develop such architecture that belongs to the TM Forum Open Digital Architecture, in order to solve all the problems we've identified before, e.g. multi-vendor interoperability, cross-domain service management and orchestration, cross-domain analytics, data sharing and management, legacy transformation, the division between OSS and BSS and end-to-end visibility to performance.

Analysis of the delivering Process for standardization docs inside an SDO (ETSI)

Alternative approach: Development and Operation (DevOps) (3)

⇨ How does it work?

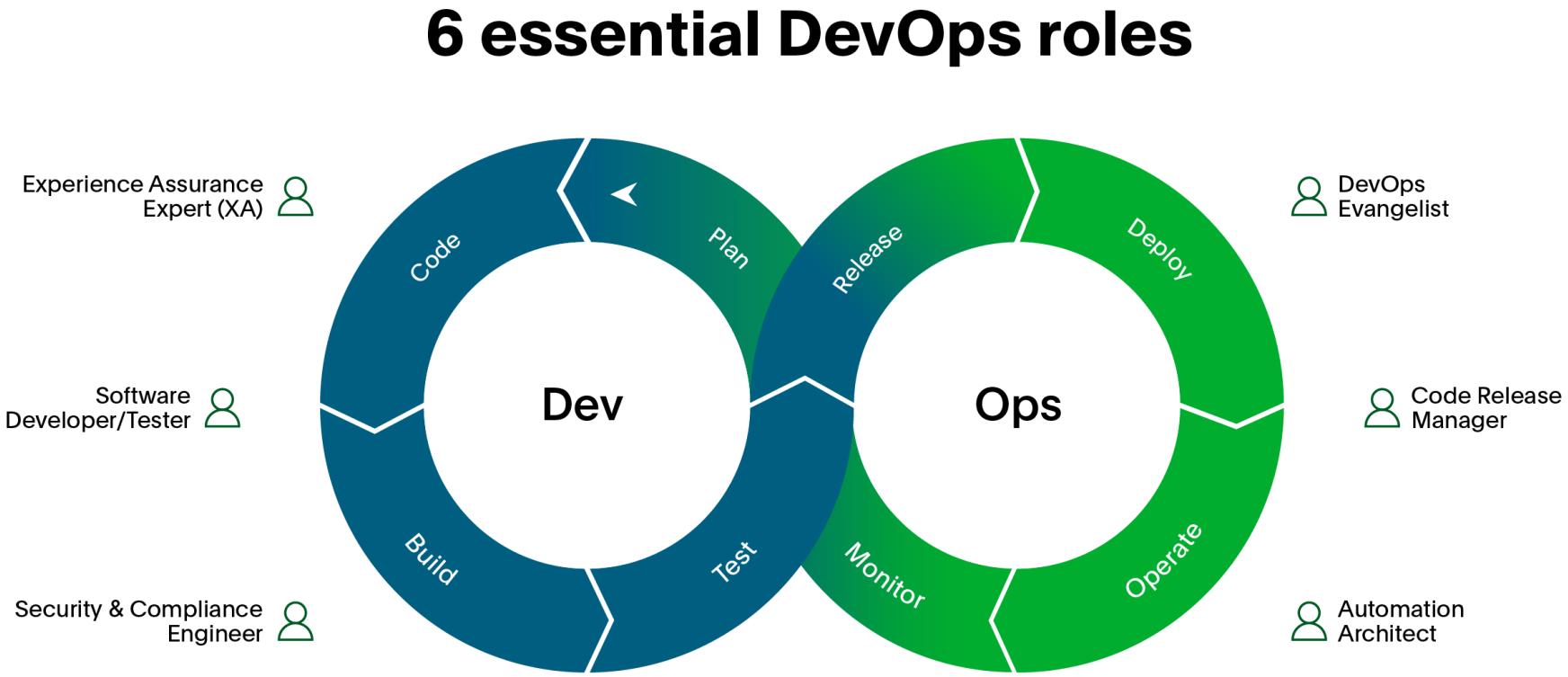
Since it's a working model, DevOps uses a set of tools., which may fit into one or more of the categories during the development and delivery process, e.g. coding, compilation, test, release, deploy, configuration, monitoring and planning.



⇨ **source** [DevOps for digital transformation, Dynatrace, 2021]

Alternative approach: Development and Operation (DevOps) (4)

⇨ Roles assumed by each player



⇨ source [DevOps for digital transformation, Dynatrace, 2021]

ETSI rules

⇨The ETSI Directives contain the following:

- Statutes – the official description of ETSI, its purpose, legal status and overall structure
- Rules of Procedure – a top-level description of the administration and operation of ETSI
- Guidelines for the implementation of Annex 2 of the Rules of Procedure
- Guide on Intellectual Property Rights (IPR Guide) – assistance in applying the ETSI IPR Policy
- Guidelines for antitrust compliance (Antitrust Guidelines)
- Board Working Procedures
- Powers and Functions delegated to the Board
- Financial Regulations
- Terms of Reference of the Finance Committee (FC)
- Terms of Reference of the Operational Coordination Group (OCG)
- Rights and obligations for ETSI courtesy title holders, ETSI fellows and retired friends of ETSI
- Technical Working Procedures – a detailed and very practical complement to the Rules of Procedure, addressing virtually all aspects of our work
- Information Policy
- ETSI Drafting Rules – a detailed and very practical set of rules for drafting our standards and other documents
- History of the ETSI Directives

⇨ IOP and Complex Standards

- are increasingly specified by ‘islands of standards’
- results in potentially non-interoperable standards and/or products

Poor Interoperability Can be Expensive

Bad publicity

- For the technology
- For the manufacturer

Annoyance to the end customer

- Damage to brand name

Loss of customer base

- Allegiances change rapidly

May affect uptake of new technology

Loss of investor confidence

We can no longer afford to get it wrong!

An overview of the Centre for Testing and Interoperability (CTI) services

ETSI Interoperability and pragmatic approach

⇨ Standardisation enables interoperability

- Enabling interoperability in a multi-vendor, multi-network, multi-service environment

⇨ Interoperability is the red thread running through the entire ETSI standardization process

- Interoperability is addressed from the beginning
- Not something ‘bolted on’ at the end, it must be built-in

⇨ ETSI takes a pragmatic approach

- Write high-quality standards
- Ensure that the standards specify the right thing
- Ensure products implement standards correctly

An overview of the Centre for Testing and Interoperability (CTI) services

Typical Causes of Non-interoperable Standards

- Requirements not well identified or missing
- Ambiguous requirements
- Varying technical quality and use of language
- Inadequate handling of options
- Lack of clear system overview
- Loose definition of interfaces (reference points)
- Poor maintenance
- Using standards beyond their original purpose
- ...

An overview of the Centre for Testing and Interoperability (CTI) services
ETSI Support for Interoperability

⇨ Technical Committee Methods for Testing and Specification (MTS)

- Standardised frameworks, methodologies, languages
  - For protocol specification
  - For testing

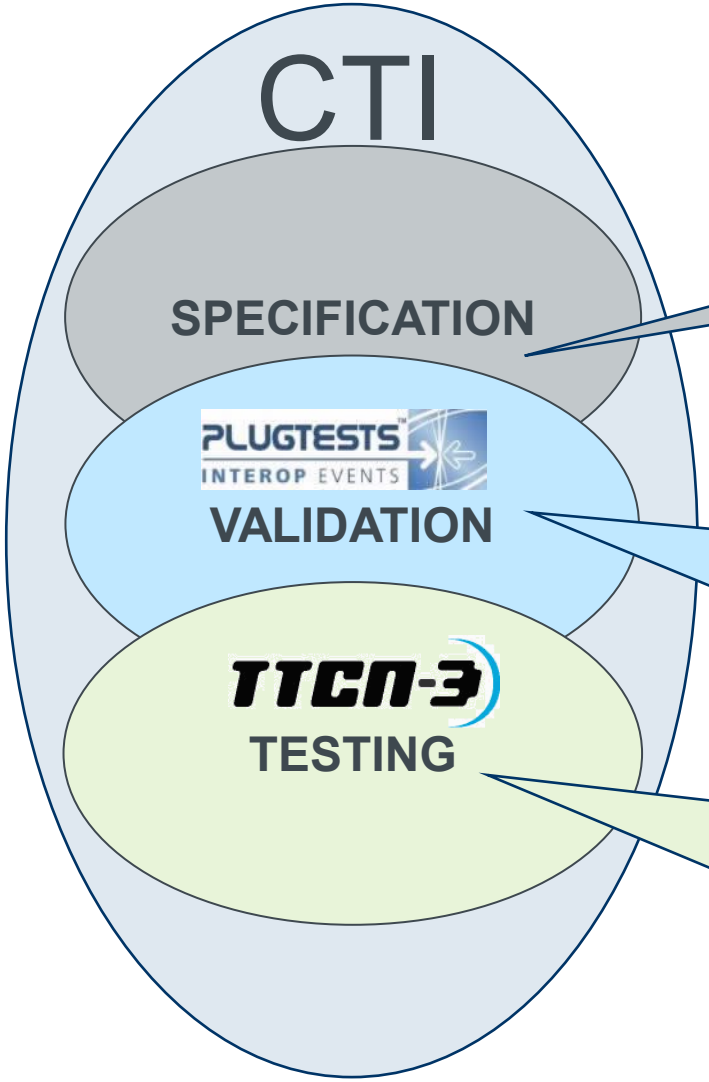
⇨ Centre for Testing and Interoperability (CTI)

- Direct support to ETSI Technical Bodies
- CTI experts can be attached to a standardization group and provide hands-on assistance

An overview of the Centre for Testing and Interoperability (CTI) services

CTI Support to TBs for the Development of Interoperable Standards

3 best practices



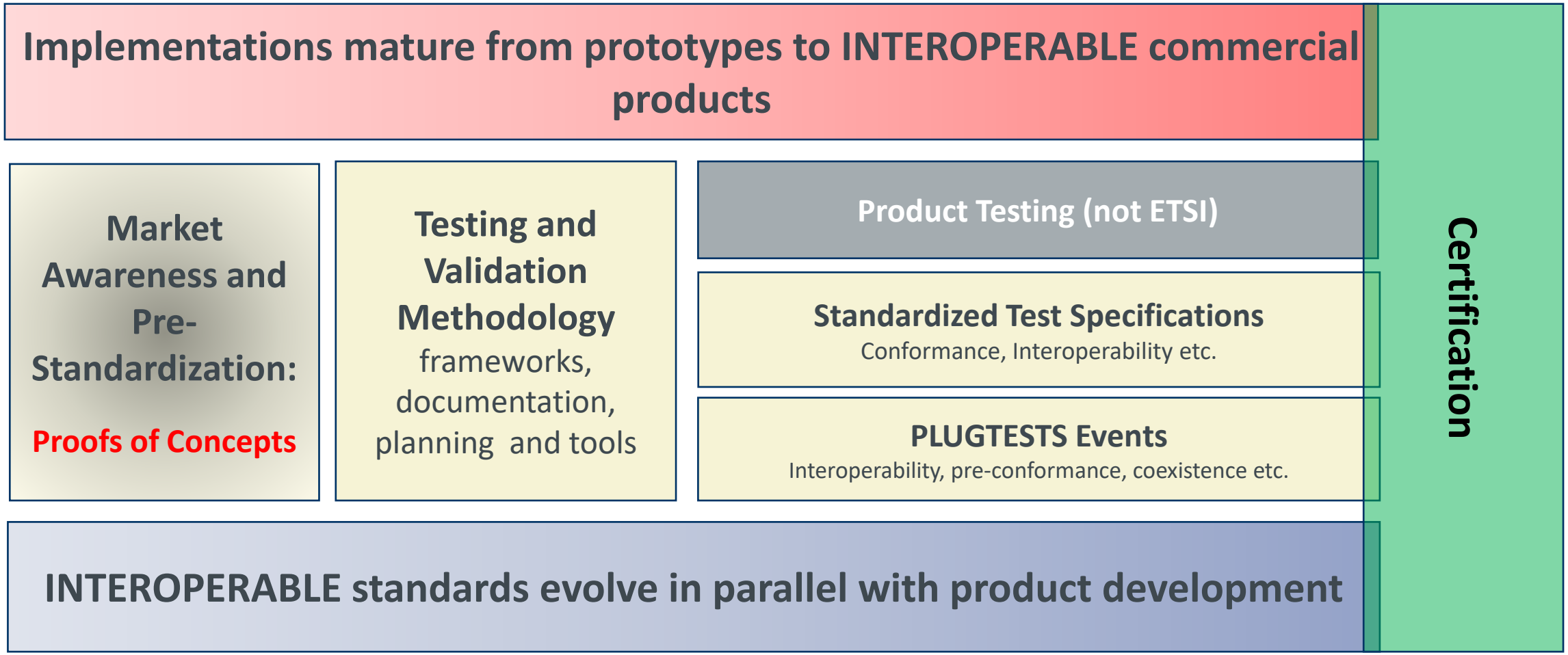
Support ETSI Technical Committees on the application of best practice protocol **specification methods**, **techniques** and **tools**.
e.g., ASN.1, UML, MBT (Model Based Testing)

Support ETSI Technical Committees on the **validation of standards**.
Mainly **Plugtests** events (**organisation** and provision of **testing expertise)**

Support ETSI Technical Committees on ALL testing aspects including the development of **test frameworks**, **methodologies**, **test specifications.** Mostly through **participation/leadership of STFs**
e.g., STF 160, ITS, TTCN-3

An overview of the Centre for Testing and Interoperability (CTI) services

Bridging the Gap between products and standards!



Benefits of Standardization from the operator point of view

1. Interoperability
2. Clarity
3. Measurability
4. Quality
5. Repeatability & error susceptibility
6. Portability & transferability
7. Innovation & automation
8. Productivity
9. Job satisfaction

Some Useful Links (1)

https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp22_ENI_FINAL.pdf

http://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp44_ENI_FINAL.pdf

ENI Terms of Reference	ENI membership list	ENI High Level Notice
ENI Member Agreement	ENI Published Deliverables	ENI White Paper
ENI Participant Agreement	ENI Presentation	ENI Blog
ENI Activity Report	ENI Wiki and PoC info	ENI Webpage

Some Useful Links (2)

- ETSI Approach to Interoperability and Testing
- An Introduction to Achieving Technical Excellence
- Guide to Writing World Class Standards
- Interoperability Best Practices
- CTI: www.etsi.org/about/our-expertise
- Plugtests: www.etsi.org/about/our-expertise
- Forge: http://forge.etsi.org
- TTCN-3: www.ttcn-3.org
- STFs & TTFs: portal.etsi.org/STF/STFs/Summary.aspx
- Mail contact: CTI_support@etsi.org

Have a rest of good workshop!

Thank you!

Backup slides

Preliminary Note

Note: During the course of this talk, several documents are used as sources for illustration purposes. They may be found at the last page of this presentation. In almost every section there is one or more than one document produced by ISG ENI, which is the ETSI group that I'm currently involved with. The intention is to show how ETSI abstractions apply to ENI.

ENI Members and Participants

Source: https://portal.etsi.org/TBSiteMap/ENI/ListOfENIMembers.aspx
Members signed the ENI Member agreement and are ETSI members
Participants signed the ENI Participant agreement but are not ETSI members

ISG ENI in a nutshell

The ENI system uses policy-driven closed control loops that use emerging technologies, such as big data analysis, analytics, and artificial intelligence mechanisms, to adjust the configuration and monitoring of networks and networked applications by sending recommendations and/or commands to an assisted system. It dynamically updates its acquired knowledge to understand the environment, including the needs of end-users and the goals of the operator, by learning from actions taken under its direction as well as those from other machines and humans (i.e., it is an experiential architecture).

Currently, the ENI System uses a set of External Reference Points to communicate with external systems. As an option, an API Broker may also be used to connect ENI with those type of systems, which enables API mediation to be performed between them.

ENI Vision

Network technology evolution

- Rapidly changing network conditions
- More services, more users

→ Network intelligence

Network mgmt. and operation evolution

- Human decisions
- Complex manual configuration

→ Orchestration and operation intelligence

ENI

- Network perception and analysis
- Data driven policy
- AI-based closed-loop control

→ Enhanced network experience

Better customer experience

Improved QoE of service

Increased service value

Improved business efficiency

Reduced OPEX

Increased profit

5G/IoT automation

Better QoE service delivery

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A Telecom Marketplace Analysis: The need for Network Transformation

⇨ Applicability to ENI (1)

- Network management systems tend to grow in Autonomy due to the increase in cognitive functionality of the management components.
- In contrast, trust in automation mechanisms is currently not widespread within Telco Operators.
  - For example, VNF autonomous scaling operations are still not enabled in many Telco Operators due to lack of trust in providing service continuity and in the underlying decision-making process.
- ENI is committed to support end-to-end automation trough AI solutions.
- The normalization and pre-processing of data, facilitating their consumption by AI modules able to generate from them appropriate action, informed by high-level policies, is a required functionality to close the gap between the already available data analytics and policy-based management systems.

A Telecom Marketplace Analysis: The need for Network Transformation

⇨ Applicability to ENI (2)

- The aim of AI assistance (recommendation) systems is that the Operator will grow its trust in AI and its ability to take the decision in autonomicity, enabling a positive progression towards a fully Autonomous Network.
- The Aim of ENI is to reduce and eventually remove human-in-the-loop.
- The Network presents to the relevant Technical Experts the possible viable solutions (Recommendations) for them to provide indications on the proper way ahead, the Technical Expert will receive the full details for all the viable alternatives, including evolution forecasts, SLA level and other elements that could be needed for the Technical Expert to evaluate each proposed alternative at best without having to investigate on its own further on.
- Manually, the Technical Expert will then select the most appropriate Recommendation, and the network will update its KPI accordingly, to be able to increase its level of confidence whenever a similar situation will be faced again.