

# 65th NMRG Meeting

## IETF 113, Hybrid

Chairs: Laurent Ciavaglia, Jérôme François

Local back-up: Diego Lopez

Secretaries: Jéferson Campos Nobre, Pedro Martinez-Julia



# Note Well – Intellectual Property

- **The IRTF follows the IETF Intellectual Property Rights (IPR) disclosure rules**
- By participating in the IRTF, you agree to follow IRTF processes and policies:
  - If you are aware that any IRTF contribution is covered by patents or patent applications that are owned or controlled by you or your sponsor, you must disclose that fact, or not participate in the discussion
  - The IRTF expects that you file such IPR disclosures in a timely manner – in a period measured in days or weeks, not months
  - The IRTF prefers that the most liberal licensing terms possible are made available for IRTF Stream documents – see RFC 5743
  - Definitive information is in RFC 5378 (Copyright) and RFC 8179 (Patents, Participation), substituting IRTF for IETF, and at <https://irtf.org/policies/ipr>

# Note Well – Audio and Video Recordings

- The IRTF routinely makes recordings of online and in-person meetings, including audio, video and photographs, and publishes those recordings online
- If you participate in person and choose not to wear a red “do-not-photograph” lanyard, then you consent to appear in such recordings, and if you speak at a microphone, appear on a panel, or carry out an official duty as a member of IRTF leadership then you consent to appearing in recordings of you at that time
- **If you participate online, and turn on your camera and/or microphone, then you consent to appear in such recordings**

# Note Well – Privacy & Code of Conduct

- As a participant in, or attendee to, any IRTF activity you acknowledge that written, audio, video, and photographic records of meetings may be made public
- Personal information that you provide to IRTF will be handled in accordance with the Privacy Policy at <https://www.ietf.org/privacy-policy/>
- As a participant or attendee, you agree to work respectfully with other participants; please contact the ombudsteam (<https://www.ietf.org/contact/ombudsteam/>) if you have questions or concerns about this
- See [RFC 7154](#) (Code of Conduct) and [RFC 7776](#) (Anti-Harassment Procedures), which also apply to IRTF

# Goals of the IRTF

**The IRTF conducts research; it is not a standards development organization**

The Internet Research Task Force (IRTF) focuses on longer term research issues related to the Internet while the parallel organization, the IETF, focuses on shorter term issues of engineering and standards making.

While the IRTF can publish informational or experimental documents in the RFC series, its primary goal is to promote development of research collaboration and teamwork in exploring research issues related to Internet protocols, applications, architecture, and technology.

See “An IRTF Primer for IETF Participants” – [RFC 7418](#)

# Online meeting etiquette

- **The session is being recorded.**
- Please keep your audio muted and video off when not presenting/speaking.
- When speaking, please start by stating your name

# Useful links

- Materials: <https://datatracker.ietf.org/meeting/113/session/nmrg>
- Notes: <https://codimd.ietf.org/notes-ietf-113-nmrg>
- Meetecho: <https://meetings.conf.meetecho.com/ietf113/?group=nmrg>
- Video recording: <https://www.youtube.com/user/ietf/playlists>  
(available post-meeting)

# Agenda

- **Introduction and RG status**, RG Chairs, 5 min
- **Intent-based networking**, 15 min
  - Status on IBN documents
  - Sharing information on IBN ecosystem and events
- **AI in/for Network Management**, 20 min
  - Research Challenges in Artificial Intelligence for Network Management document
- **Network digital twins**, 45-60 min
  - "How to build a Digital Twin? Emulation vs. Simulation vs. Analytical vs. Neural Networks", Jordi Paillissé & Albert Cabellos, 20min. + Q&A
  - Network Digital Twin: Concepts and Reference Architecture, Updates and future directions, Cheng Zhou, 10 min.
  - Reflections on Network Digital Twin research: problem space, research challenges, questions and directions
- **Other topics**, remaining time (~10-20 min)
  - Evolution of Cooperating Layered SDN Architecture including Compute and Data Awareness, Luis Contreras, 10 min.
  - Reflections on CLAS evolution



# Status of RG documents

- **In IRSG poll**
  - Intent-Based Networking - Intent Classification (*ends April 14<sup>th</sup>*)  
<https://datatracker.ietf.org/doc/draft-irtf-nmrg-ibn-intent-classification/>
- **In IRSG review**
  - Intent-Based Networking - Concepts and Definitions (*under progress*)  
<https://datatracker.ietf.org/doc/draft-irtf-nmrg-ibn-concepts-definitions/>
- **Recently adopted RG document**
  - Digital Twin Network: Concepts and Reference Architecture  
<https://datatracker.ietf.org/doc/draft-irtf-nmrg-network-digital-twin-arch/>
- **Candidate RG document**
  - Network measurement intent - one of IBN use cases (*ends April 8<sup>th</sup>*)  
<https://datatracker.ietf.org/doc/draft-yang-nmrg-network-measurement-intent/>

# Sharing information on IBN ecosystem and events

- **Work of interest in other groups and fora (not exhaustive)**
  - **LFN Open Network Automation Platform (ONAP)**
    - Several IBN use cases in different releases <https://wiki.onap.org/display/DW/Intent+Based+Networking+Base+Use+Case+Page>
  - **ETSI Zero-touch network and Service Management (ZSM ISG)**
    - GR 011 - Intent-driven autonomous networks, latest draft:  
[https://docbox.etsi.org/ISG/ZSM/Open/Drafts/0011\\_IntentDrv/ZSM-011\\_IntentDrv014.zip](https://docbox.etsi.org/ISG/ZSM/Open/Drafts/0011_IntentDrv/ZSM-011_IntentDrv014.zip)
    - PoC on Automation of Intent-based cloud leased line service [https://zsmwiki.etsi.org/images/4/4d/ZSM\\_POC\\_3.pdf](https://zsmwiki.etsi.org/images/4/4d/ZSM_POC_3.pdf)
  - **ITU-T Focus Group on Autonomous Networks (FG-AN)**
    - Proof of Concept (PoC) and Proposal for a “Build-a-thon” for ITU AI/ML in 5G Challenge 2022  
<https://extranet.itu.int/sites/itu-t/focusgroups/an/input/FGAN-I-216.docx>
  - **TM Forum Autonomous Networks Project**
    - IG1253 Intent in Autonomous Networks, latest draft:  
<https://www.tmforum.org/resources/standard/ig1253-intent-in-autonomous-networks-v1-1-0/>
    - Part of broader IBN related documents set (cf. next slide); also investigating IBN use cases

# INTENT DELIVERABLES IN 2H2021

Stage 1

**TMF921A**  
Intent API Profile

3 New Approved Guides

## IG1253: Intent in Autonomous Networks

Stage 2

1253A:  
Intent Modelling

**1253B:**  
Intent Handling  
Scopes and  
Information  
Models

1253C:  
Intent API and  
Life Cycle  
Management

**1253D:**  
Intent Handling  
Capability  
Management

1253E:  
Using Unified  
Intent - Use  
Cases,  
Scenarios and  
Examples

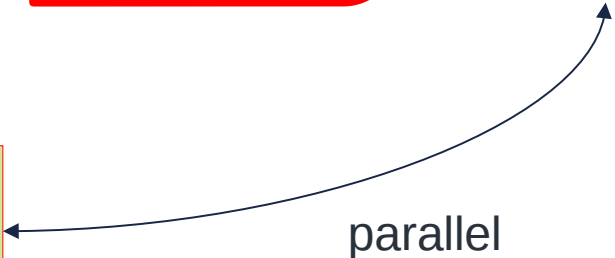
Stage 3

With FX /ISA /SID team now...

**Intent in SID**  
Proposal being  
Finalized

**Ontology  
Development  
Underway**

**TMF921**  
Intent API  
Specification



# Sharing information on IBN ecosystem and events

- **2nd International Workshop on Intent-Based Networking (WIN'2022)**  
in conjunction with IEEE Netsoft 2022m June 27, 2022 or July 1, 2022 // Milan, Italy  
<http://www.adda-association.org/win-2022/> + hands-on tutorial based on TMF documents (TBC)
- **Research corpus continues to grow with more individual papers and special issues (extract):**
  - Special Issue on Zero-touch Network and Service Automation (ZSM), River publisher, Journal of ICT standardization  
<https://journals.riverpublishers.com/index.php/JICTS/issue/view/729>
  - Intent-Based Software-Defined Networks, MDPI, Computers [h](https://www.mdpi.com/journal/computers/special_issues/intent_based_SDN)  
[https://www.mdpi.com/journal/computers/special\\_issues/intent\\_based\\_SDN](https://www.mdpi.com/journal/computers/special_issues/intent_based_SDN)
  - Intent-driven Autonomous Network and Service Management in Future Networks: A Structured Literature Review  
<https://arxiv.org/pdf/2108.04560.pdf>
  - An Intent-Driven Orchestration of Cognitive Autonomous Networks for RAN management, CNSM 2021  
<https://ieeexplore.ieee.org/abstract/document/9615505>
  - Orion: Google's Software-Defined Networking Control Plane, NSDI 2021,  
<https://www.usenix.org/conference/nsdi21/presentation/ferguson>
  - End-to-End Intent-Based Networking, IEEE Communications Magazine, October 2021,  
<https://ieeexplore.ieee.org/document/9627829>

# Future meetings

- Interim meetings, follow-ups and new proposals
  - IBN use cases
    - incl. participation at WIN 2022
  - Designing, deploying and operating distributed AI
    - Looking to co-locate meeting with conference or workshop
  - ...
- July 2022, IETF 114, Philadelphia, USA

# Future meetings

IETF 114 – Philadelphia, USA – July 2022

Interim meetings on

- Designing, deploying and operating distributed AI
- IBN use cases

Until further notice, the default mode of operation will increasingly rely on:

- (Monthly) Virtual Meetings
- Mailing list
- Collaborative platforms (e.g. Github, Google Docs, etc.)

Do not hesitate to share your questions, ideas or needs with the groups or chairs !