

70th NMRG Meeting – Session 2

IETF 117, Hybrid

Chairs: Laurent Ciavaglia, Jérôme François

Secretaries: Jéferson Campos Nobre, Pedro Martinez-Julia



Information for participants

- **Remote participants**

Please keep your audio and video are off unless you are chairing or presenting during a session

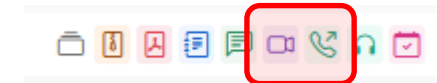
- **Onsite participants, please**

Sign into the session using MeetEcho from the Datatracker agenda

or by scanning the QR code

Use MeetEcho to join the mic queue

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Note Well – Intellectual Property

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- 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
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- 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
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- 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](#)

Meeting useful links

- Materials: <https://datatracker.ietf.org/meeting/117/session/nmrg>
- Meetecho: <https://meetings.conf.meetecho.com/ietf117/?group=nmrg>
- Notes: <https://notes.ietf.org/notes-ietf-117-nmrg>
- Video recording: <https://www.youtube.com/user/ietf/playlists> (available post-meeting)

Objectives

- **Questions shared on the mailing list to**
 - **Define the important topics to be addressed in NMRG**
 - **How to address these topics in NMRG?**
 - **The expected outcomes of the RG**

Agenda

- Discussions on RG topics
 - Green Networking
 - Challenges and Opportunities in Green Networking, draft-irtf-nmrg-green-ps-00, Alex Clemm
 - IBN
 - Data Management
 - Data management paradigms: data fabric & data mesh, Ignacio Dominguez Martinez-Casanueva
 - AI
- General comments / feedback about NMRG
- Chairs' concluding remarks
- Open mic

DISCLAIMER

- **Following slides summarize the opinions and view expressed by participants**
- **It is not the NMRG chairs' opinion**

Green networking

- **Follow-up of the current group document?**
 - Data models and instrumentation to assess and attribute carbon footprint
 - Carbon telemetry
 - Event representation (e.g. alarms)
 - Couple with AI: network carbon optimization for path optimization
 - Impact of green networking on network management (service disruption device lifetime, decision efficiency, etc.)
- **How to have NMRG in the big picture and position the group?**
 - IAB proposed e-impact program
 - Make formal liaisons with other SDOS
 - ☐ progress rapidly on the current document
 - Coordinate with groups in OPS (models), Routing (applicability) and Transport (exposure)

IBN

- **Use cases**
 - Cover a larger variety
 - Resume dedicated interim meetings (there are already several propositions and work done...)
- **Other work items to continue / develop**
 - Architecture: discussion but no real success
 - Mediation and assurance
 - Interfaces between Intent Lifecycle functions
 - Intent representation, aggregation / outcome representation, interpretation – what abstractions would be needed, what gaps exist – is YANG sufficient?
- **Support standardization**
 - Identify some killer use case: look at a particular type of intent, then determine what it would take to achieve it – from data to protocol extensions to other mechanisms
 - Network automation (ANIMA)

Data management

- **Possible contributions:**
 - Document on distributed and scalable data management including guidelines for applying recent approaches to network management
 - **Data quality (How to ensure quality of data as this becomes critical for AI among others?)**
 - Generated data / telemetry to be done in accordance with a targeted quality (data-quality-by-design)
 - Explore methodologies, based on metadata, for data owners to publish high-quality, trustworthy and understandable datasets
 - Expected quality depends on the application → ensure a better integration of telemetry processes with the final application
 - → propose method to assess data quality based on use case / NM taxonomy
 - Labeling process (for humans and for machines)
 - **Datasets?**
 - Not the goal of NMRG but can support initiatives (in cooperation with CNOM/NOMS community)
 - Review existing dataset (Assess the quality with our proposed methods or share lessons learned)
 - “Which dataset for what?” Maintain a catalog? (see European initiatives with Data spaces and Zenodo repositories)
 - Specific academic workshop (beyond NMRG)
 - Looks at the bigger picture in terms of collecting, correlating and aggregating network modelled data
 - Next steps for network telemetry framework
 - Bridge the gap between network and data industry (integrate NM processes into data processing pipelines)
 - **Transfer results and ideas** to related WGs (NMRG, AI-CAF, 112) and other SDOs (3GPP, ETSI, TMF...)

AI

- **Challenges of coupling AI-NM**
 - Stable and mature document: “finalize it rapidly”
 - Focus on a few of challenges (Explore the solution space for the selected challenges) for the next steps
 - Make connections with other topics (e.g. DTN)
- **Possible work items**
 - Measurement / data model / telemetry extensions (to better enable AI applications)
 - Distributed AI: enablers for sharing (+disseminating, updating) federated models
 - Metadata to facilitate lineage tracing (to facilitate explainability, better understand impact of training data & help adapt models to new networking contexts. Etc)
 - Deployment/implementation (pinpoint successes and fails)
 - Do not propose a unique architecture but **use cases** (traffic management, incident management...)
- **In IETF ecosystem:**
 - Align with OPS and Security areas (trustworthiness aspects)
 - AI in other WG/RGs: NMRG as one main driver?
- **Need for data and AI experts?**

General Remarks

- **NMRG should continue**
- **Open forum to share new ideas**
 - □ Always align with up-to-date topic = evolves on-time with new (network management) technologies
 - □ difficult to follow-up on all proposals □ need more interim meetings to maintain discussions on topics which create some interest during IETF meetings
- Reinforce connections with others WGs, RGs and SDOs

Types of contributions and outcomes

- **Drafts / RFCs**
 - Allows to articulate and document RG research
 - = visible outputs of the groups (on the datatracker)
 - Help possible transitions to IETF WG
- **Drafts should not be the only target, a more agile and less rigid methodology would be desirable**
 - Brainstorming sessions
 - Practical work / coding to validate ideas (e.g., during IETF Hackathons) as a preamble for a draft
 - Technical presentations / workshop series
 - Only something that could potentially become relevant for standardization
 - Collide with numerous academic workshop

NMRG topics

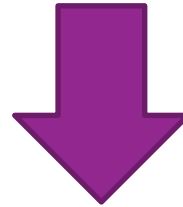
- **Current topics**
 - Ok but maybe with some priorities?
 - ☐ **priorities should also align with the level of efforts participants are ready to devote**
- **Data and metadata management**
 - Data (and do not forget metadata) are essential to enabling other new technologies already identified like IBN, AI, green networking, or autonomous networks.
 - Addressed in different topics / documents (DTN, AI) but beyond a unique RG “topic” ☐ a topic by itself?
 - Possible contributions:
 - Document on distributed and scalable data management including guidelines for applying recent approaches to network management
 - Transfer results and ideas to related WGs (OPS Area), and other SDOs (3GPP, ETSI, TMF...)
- **SNMP ☐ YANG ☐ ... ?**
 - Revise current management frameworks and see where there is room for improvement (and how), e.g. assurance

Concluding remarks (Chairs' views) 1/4

Many constructive comments and **numerous propositions**... THANK YOU!!!

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Keep focused with a defined research agenda



We have to **define priorities**

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Open forum for new and emerging ideas

Concluding remarks (Chairs' views) 2/4

- **Types of contributions / outcomes**

- All types are fine (drafts, implementation, demo, etc.)
- No constraints but need some effort to track all of them

- **Connections with others RGs, WGs and SDOS**

- Encourage identify even in early stage of research done what could lead to / support a new standard
- Rely in the involvement of NMRGers in other groups

Concluding remarks (Chairs' views) 4/4

- **NDT discussed during session 1**
- **Green Networking**
 - Carbon footprint / telemetry
 - But no clear view of NMRG role and next steps □ **A dedicated interim meeting** to possibly define a precise research agenda + liaise with e-impact IAB program for wider discussion
- **IBN**
 - Encourage use cases authors to provide an overall plan
 - Other proposed work items are relevant
 - **But if no contribution by IETF 119, do not consider IBN as a priority for the RG**
- **AI**
 - Focusing on specific challenges with use cases □ **dedicated interim meeting** to find a consensus on those challenges
- **Data management**
 - A good momentum, linked with other topics (AI, NDT): Data quality, measurement and telemetry frameworks
 - **Dedicated meeting to refine the research agenda**

Concluding remarks (Chairs' views) 4/4

- Remember: NMRG is a research group
- Contribution should clearly state or address one or more research questions
 - □ Draft should explicit describe the research question(s) in the introduction (one criteria for group adoption)
- Research scope is (too) ambitious ; we need focus and visible progress
- Need more continuous efforts to progress on the different prioritized topics
 - Initial step: organize again more frequent topic-specific interim meetings
 - Once the research agenda is refined, polls will be used to identify people willing to actively contribute to agreed work items