70th NMRG Meeting

IETF 117, San Francisco + 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

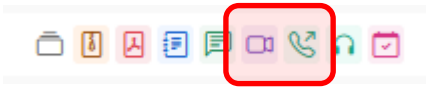
- **Onsite participants, please**

  Sign into the session using MeetEcho from the Datatracker agenda

  or by scanning the QR code

  Use MeetEcho to join the mic queue

  Keep audio and video off if not using the onsite version



• You MUST sign into the session using MeetEcho (usually

Note Well – Intellectual Property

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- By participating in the IRTF, you agree to follow IRTF processes and policies:
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  - 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

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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
- 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

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)

NMRG at IETF 117

- **Session 1 – Tuesday 25 July – 17:00**
  - Focus on NMRG research agenda for Network Digital Twin

- **Side meeting – Wednesday 26 July – 17:30**
  - Focus on Evolution of the Network Management Research Group
  - Room Continental 2-3 + remote participation
  - Information available at https://wiki.ietf.org/en/meeting/117/sidemeetings

- **Session 2 – Thursday 26 July – 17:00**
  - Focus on Evolution of the Network Management Research Group

Agenda – Session 1

- **Introduction**, RG Chairs, 05 min

- **Data Collection Requirements and Technologies for Digital Twin Network**, Cheng Zhou, 15 min. https://datatracker.ietf.org/doc/draft-zcz-nmrg-digitaltwin-data-collection/

- **Discussion on Network Digital Twin**, 35 min
  - Goal: Define NMRG research agenda on Network Digital Twin

- **Concluding remarks**, RG chairs, 05 min

Agenda – Session 2

- **Introduction**, RG Chairs, 05 min

- **NMRG Evolution**, 50 min

  Summary of NMRG mailing list discussion and side meeting outcome

  - Type of NMRG activities and meetings
  - Topic discussion (IBN, AI, Green Networking, Others)
  - Presentation supports to initiate the discussions

    - Data management paradigms (data fabric & data mesh), Diego Lopez & Ignacio Martinez-Casanueva

    - Challenges and Opportunities in Management for Green Networking, Alex Clemm

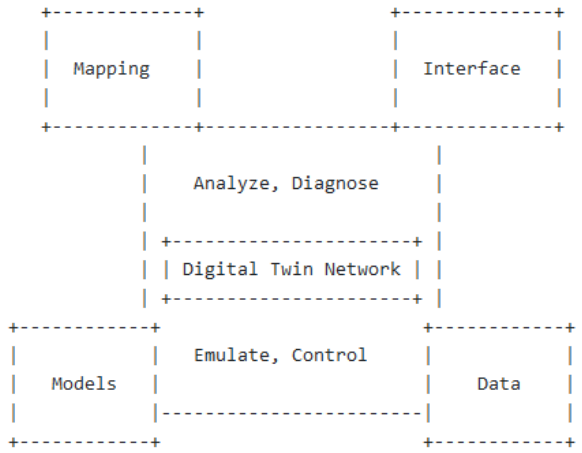
  https://datatracker.ietf.org/doc/draft-irtf-nmrg-green-ps

- **Concluding remarks**, RG chairs, 05 min

Network Digital Twin (NDT)

Digital Twin Network: Concepts and Reference Architecture (RG document):

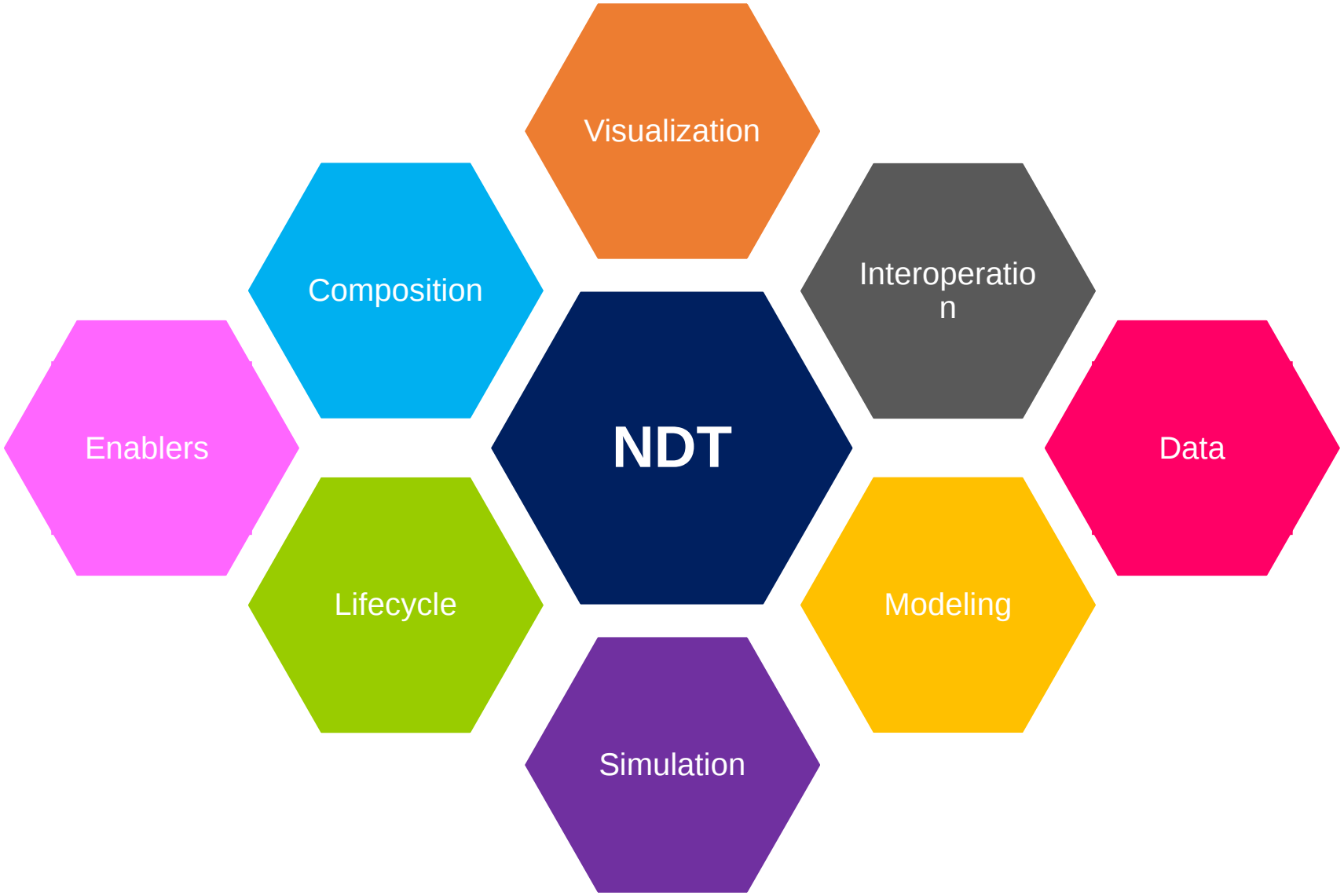
- Concepts, basic definition and architecture
- Beyond simulator and emulator
- Interactive virtual-real mapping and data driven approach to build closed-loop network automation.



Individual drafts on the different aspects of the proposed digital twin architecture

- **Requirements for Interfaces of Network Digital Twin:** Interfaces between the twins and with applications (analyze, diagnose…)
- **Data Collection Requirements and Technologies for Digital Twin Network:** real-time information about the physical network to update the DT, protocol for data exchange
- **Data Generation and Optimization for Digital Twin Network Performance Modeling:** accurate and realistic synthetic data generation
- **Graph Neural Network Based Modeling for Digital Twin Network:** models: how to represent a real network as a digital twin
- **Functional Design Aspects of Performance-Oriented Digital Twins:** Learning commonalities from application of DT to specific purpose or use-case

Example of research areas



Defining NMRG research agenda on NDT

1. **Formulate research questions and objectives**
   → Differentiate research work from standardization and engineering

2. **Articulate propositions, priorities/focus**
   → Concentrate efforts to generate enough momentum and work progress

3. **Think about the most appropriate forms of results**
   → Internet drafts, publications, implementations…

4. **Liaise with other groups and communities (inside & outside of IRTF/IETF)**
   → Position well NMRG role and work in the overall landscape ; benefit from and contribute to cross-pollination and synergies

5. **Initiate and continue work on (incl. existing documents)**

- NDT research challenges
- Design guidelines and architecture
- Use cases
- Enablers
- Standards implications
- …