



NATO Interoperable Instant Communication Environment



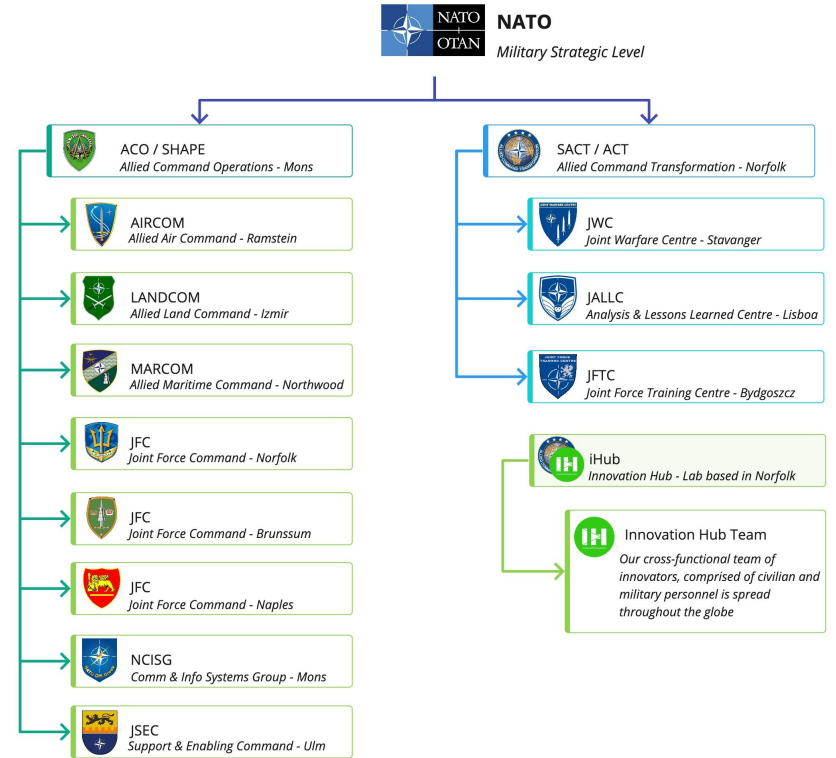
The Innovation Hub (IH) within the NATO Command Structure



Innovative design and software solutions

IH Mission: “To inform NATO capability requirements through Innovation to the Warfighters (ACO) and Warfare Developers (ACT)”

- IH offers a unique opportunity to **explore technology solutions** and validate those ideas before committing to the development of a production-level system.
- The IH is a team of experts (both military and civilian), with various industry backgrounds working within the NATO organization.





How NI2CE started



ACT Priorities: Digital Transformation - NI2CE Messenger: Communication is KEY

Purpose:

Provide a safe enough alternative for commercial instant messaging on private devices

Benefits:

Safe instant messaging without data leaks and increased resilience

Features: instant messaging, location sharing, voice messages

(basically anything you would want from a modern messaging app)

Stakeholders:

HQ SACT, ACO, NMI, JFC Norfolk, (possibly the whole NATO Enterprise)



Secure messaging

Based on the Matrix messaging protocol

Interoperability



NI²CE Messenger

NATO Interoperable Instant Communication Environment Messenger

The NATO Interoperable Instant Communication Environment (NI²CE) Messenger is a **proof of concept** project with the following objectives:

- Use post quantum proof encryption schemes
- Demonstrate the usability of the Matrix protocol and the compatible end-user applications for the NATO Enterprise and NATO missions and capture additional user requirements
- Analyze and certify the use of bridges to connect Matrix to the NS environment and JChat



NI2CE allows for secure & safe communication across NATO bodies on private devices, supporting the digital transformation of the Alliance



NI2CE as a Proof of concept

- Open source
 - Matrix server (Synapse in docker)
 - Clients (Element web & Element on Android & iOS)
 - Matrix server + XMPP bridge in NSF to evaluate interfacing to JChat
- Limited
 - Number of users
 - Availability (impact hosting configuration)
 - Tier 1 & 2 support
- Post-Quantum Resistant Encryption demonstrator failed due to licensing issues
- Flexible in user onboarding & federation
- Features out of scope
 - Video & Voice calling
 - Accreditation for NATO UNCLASSIFIED or higher
 - Integration with NATO SSO solutions





What NI2CE evolved into





- About 700 MAU on Element Enterprise Server, hosted by IH
- Official applications on Apple & Android stores
- First NCIA Penetration testing done, second to follow
- “Hardening” of the installation
 - On-prem map service & identity service
 - Rage shake disabled
 - Less flexible in user onboarding
 - Certificate pinning in mobile apps
 - Reduced federation & removed XMPP bridge
- Moving from MVP to production solution due to demand in operational community
- Matrix as an BYOD interface solution





- Other experiments
 - Bots: InnoGPT, webhooks, RSS, ...
 - Bridges to Signal & Whatsapp & Meshtastic
 - Using Matrix as a distributed data bus (images // IoT // ATAK)
 - Thirdroom as C² solution for interfacing with other instruments of power (MDO)
- Backlog
 - Message (classification) marking demonstrator
 - Single NATO mobile app to multiple Matrix servers in NATO (Matrix federation)
 - Bridge to Sitaware C²
 - Windows installer for Element on NU
 - Post-Quantum encryption...someday
 - Improved XMPP bridge (linked to message classification)... someday
 - Better federation configuration



Conclusions





- Dedicated mobile apps are key
 - Branding
 - Additional policies/features enforcements
 - Onboarding experience
 - Don't try to publish apps yourself
- Element On-premise advantages from my personal experience
 - Scalability
 - More features we'll incorporate in the future (virus scan, admin&audit bot)
 - Support from Element
 - Data ownership & resiliency
 - Can be challenging to set up





- Federation: complexer than estimated, requires granularity and experiments
- Words matter → PQR in research scope, not feature... but technically possible
- Include Legal teams from beginning
- Buy in from senior management is essential
- Stand-alone IAM is a feature, not a bug
- Need for better collaboration / exchange of information / federation in NATO
 - Matrix Community of Interest
 - Register here: <https://events.innovationhub-act.org/event/4/>



More information:

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