

Experiments with Web Services at Combined Endeavor 2009

Frank T. Johnsen
Trude Hafsøe

**Norwegian Defence Research
Establishment (FFI)**

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Combined Endeavor is an annual multi-national event featuring NATO and Partnership for Peace nations

NATO



BELGIUM



FRANCE



LITHUANIA



ROMANIA



UNITED STATES



CANADA



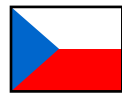
GERMANY



NORWAY



SLOVAKIA



CZECH REP



HUNGARY



NETHERLANDS



SLOVENIA



DENMARK



ITALY



POLAND



TURKEY



ESTONIA



LATVIA



PORTUGAL



UNITED KINGDOM



AUSTRIA



FINLAND



IRELAND



SWEDEN

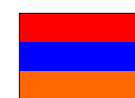


SWITZERLAND

PfP



ALBANIA



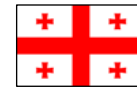
ARMENIA



BOSNIA and HERZEGOVINA



CROATIA



GEORGIA



MACEDONIA



MOLDOVA



MONTENEGRO



SERBIA



UKRAINE



This presentation focuses on Web services and interoperability between fixed and mobile networks



Mobile users collect information.



The deployed HQ gathers information.



Result: A common operational picture.

Mobile users use heterogeneous communications equipment



Mobile users take an active part in a mission, reporting events back to the HQ.

HQ gathers information and shares it with other deployed networks.

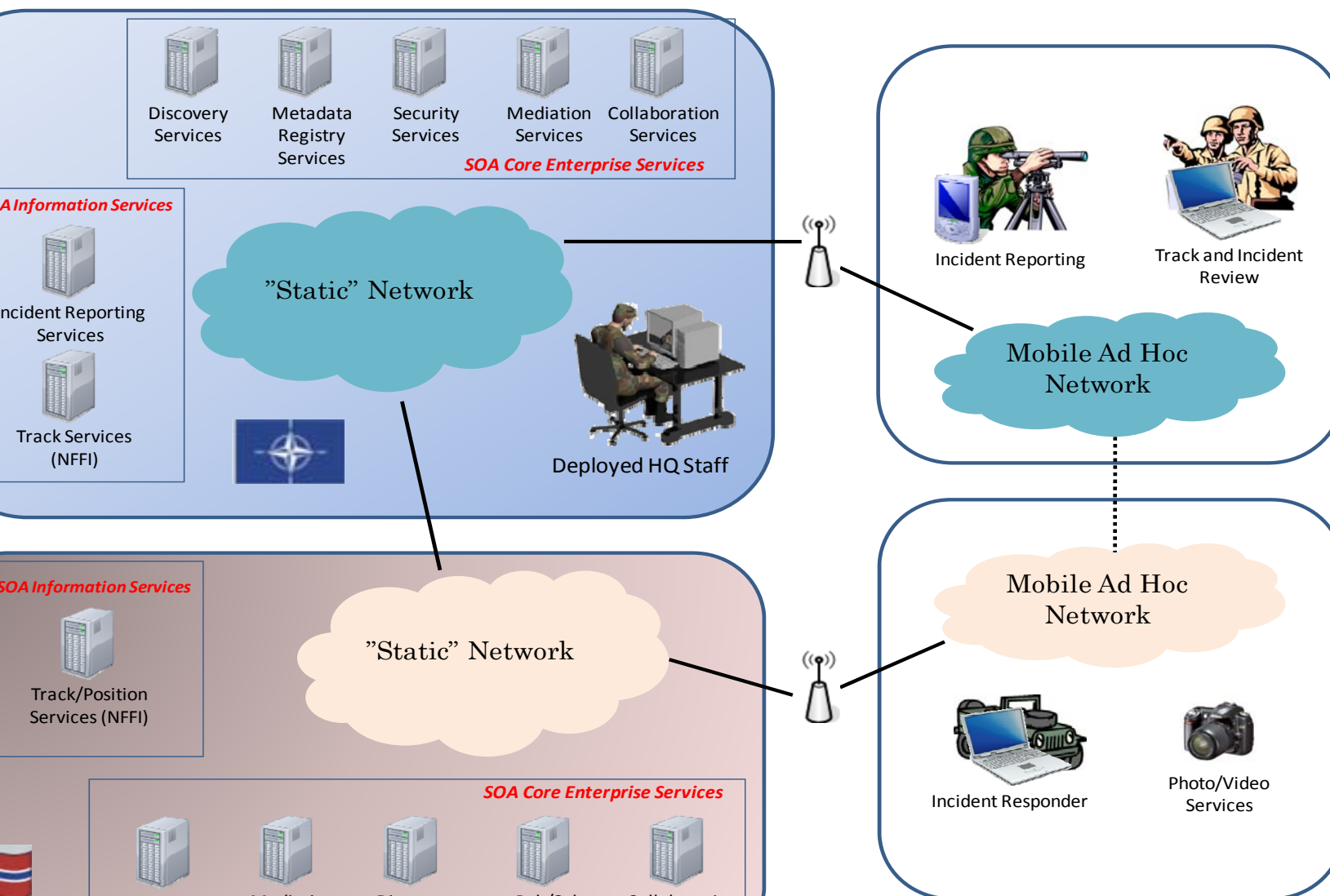
HQ has fixed infrastructure, and ways to the mobile users.

Interoperability across networks is ensured using back-to-back IP radios.



Web services provide application level interoperability.

NC3A – Norway network interconnections and information sharing



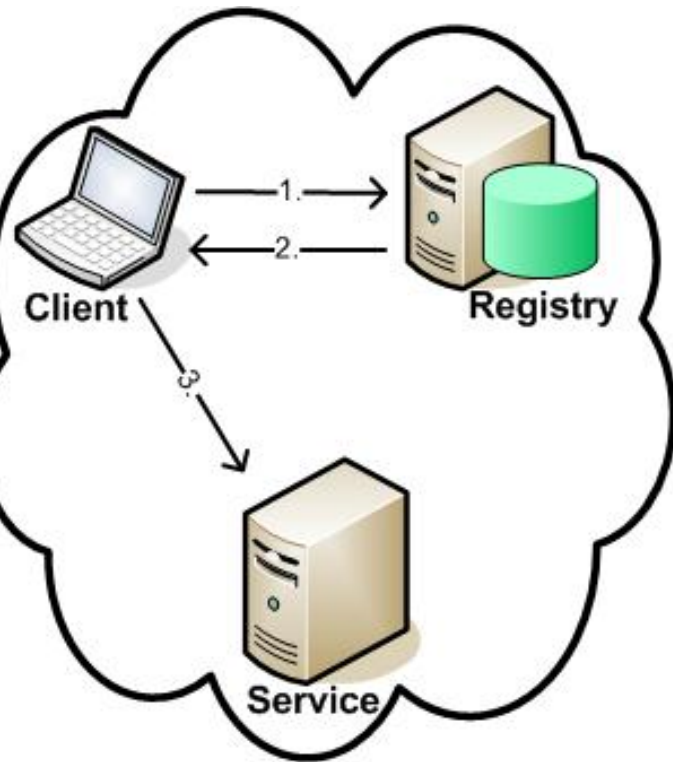
Thanks to network and application interoperability, we can create a common operational picture.



Mobile users report incidents back to the HQ.

The HQ is able to gather and visualize this information.

Service Registries

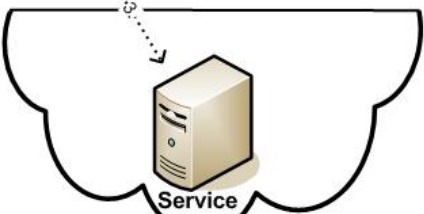
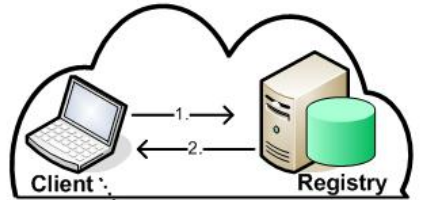
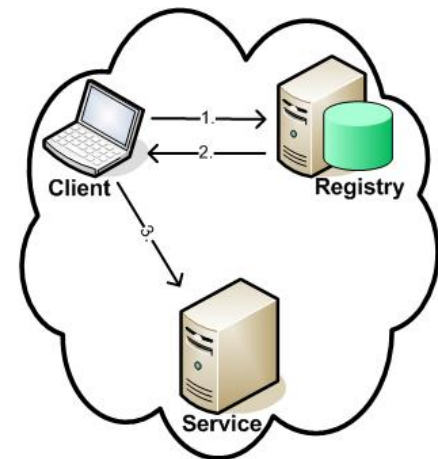


**Communication
between client,
registry and service:**

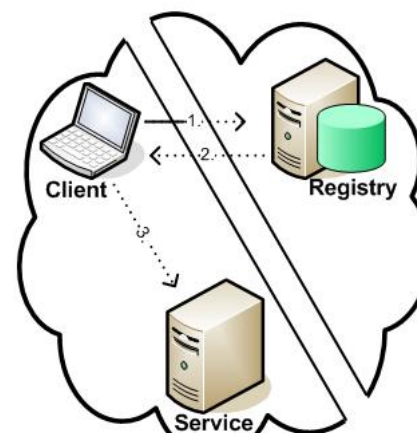
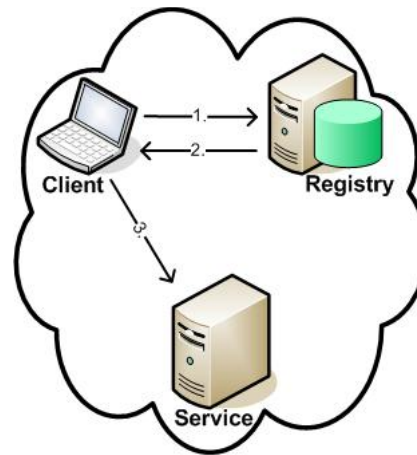
- 1. Look-up/Search**
- 2. Response**
- 3. Contacting the service**

Service Registries

The liveness problem



The availability problem



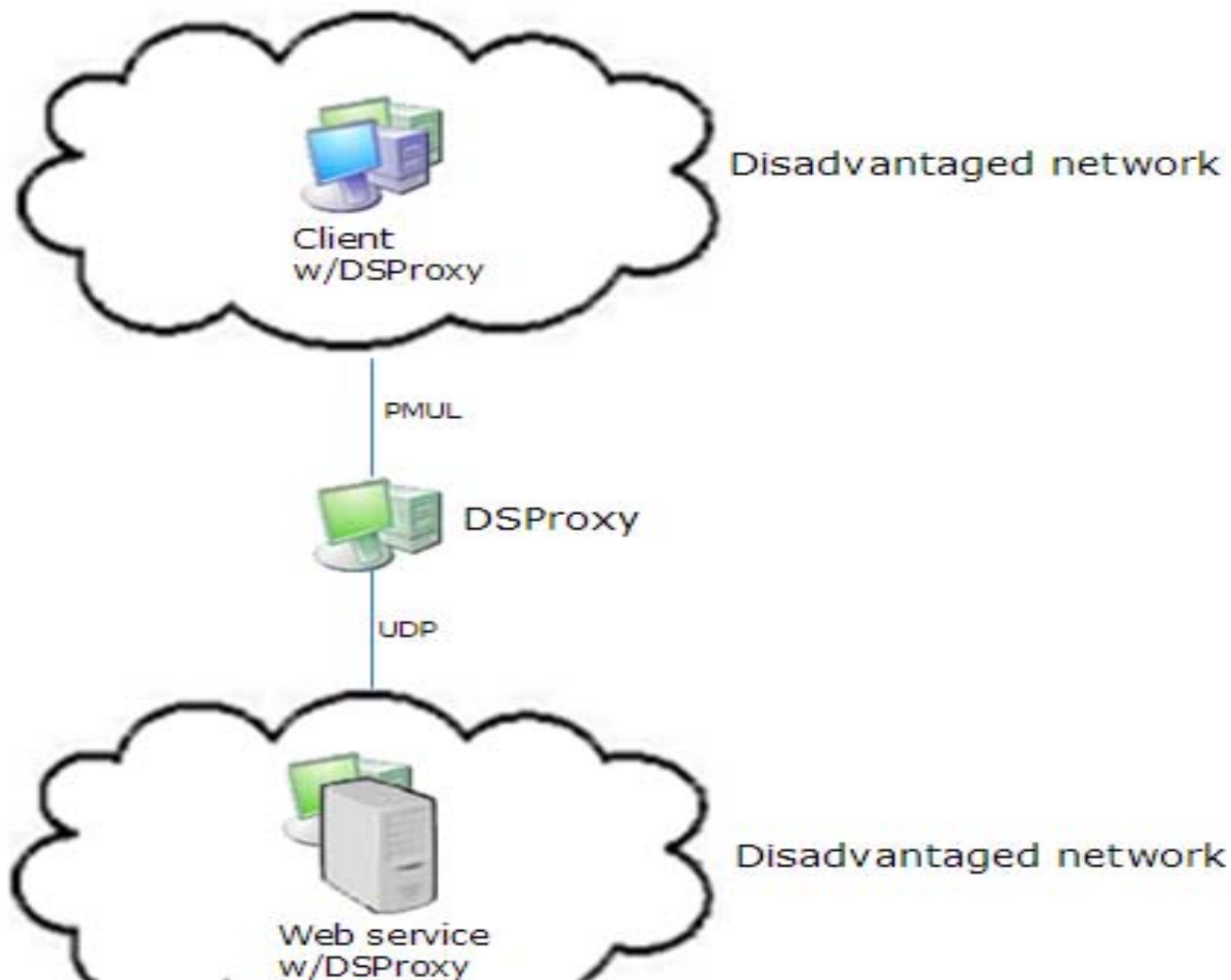
**Centralized solutions are usually more “chatty” than
decentralized solutions: Need to optimize data rate
requirements!**

- Piggybacking
- Data compression
- Caching & timeouts

Service discovery in different networks requires different mechanisms.

Network type	Discovery technology	NC3A mechanisms at CE	NOR mechanisms at CE
Local deployed network (HQ)	Federated registry	NATO Metadata Registry and Repository (NMRR)	The ebXML reference implementation, aka "Omar"
Local mobile network	Ad hoc discovery	Experimental mechanism: "SAM"	Experimental mechanism: "SOP"

DSPProxy provides disruption tolerance, assuring that once you have discovered a Web service, it can be invoked.



Screenshot from the Norwegian HQ

The screenshot displays a Windows desktop environment with several open applications. The primary application is a 'Map Creator' window, which features a satellite map of a rural area with a canal. The interface includes various control buttons such as 'Select map', 'Calibrate', 'start gps', 'stop gps', and 'Submit to service'. It also has a 'Subscribe to services' section with two URLs: `http://127.0.0.1:7000/?uniqueServiceName=car2Service` and `http://127.0.0.1:7000/?uniqueServiceName=car3Service`. The status indicates 'Running...'. Other controls include 'Aggregate positions', 'Retrieve Aggregated', 'Add Red Position', and 'Clear map'. A 'Base' field is set to `127.0.0.1:7000/?uniqueServiceName=gatewayService` with an interval of 3000.

Overlaid on the map is a 'WS Invocator v. 2.3.3' window. The 'Chat' tab is active, showing a log of messages. The messages include:

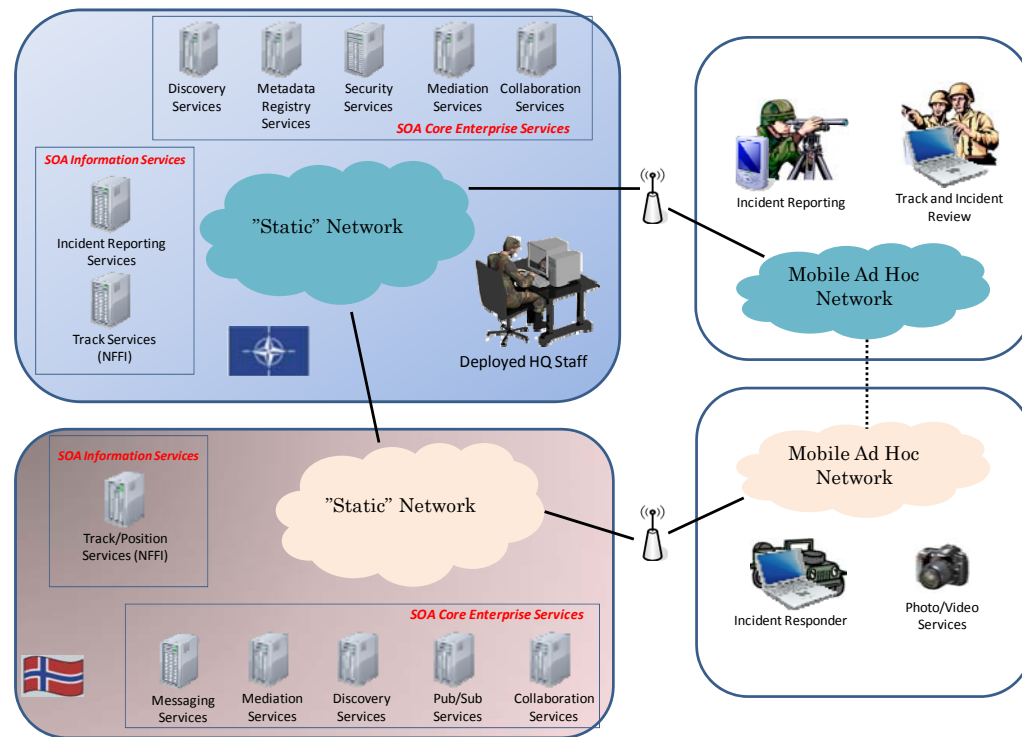
- 15:46 DHQ: unit 2 - please provide visual report
- 15:44 Unit 2: confirmed
- 15:44 Unit 2:
- 15:42 DHQ: maintain distance of not less than 150 meters
- 15:44 Unit 3: understood. Moving to position
- 15:42 DHQ: use extreme caution and do not engage - observe and report only
- 15:41 DHQ: unit 2, coverage location from northern approach
- 15:41 DHQ: unit 3, approach location from south-east
- 15:41 DHQ: consult JOCWatch for details
- 15:41 DHQ: possible insurgent activity along canal road
- 15:40 DHQ: approx 2 km south baser
- 15:40 DHQ: Mobile units, suspicious activity reported at 53 20.51.36N 6 16.08.96E
- 15:41 Unit 2: Unit 2 on patrol 0.5km N of base
- 15:40 Unit 3: Unit 3 on patrol 2km east of base
- 15:37 DHQ: mobile unit 2 and mobile unit 3, please report status
- 15:39 Unit 3: Unit 3 in position
- 15:06 Unit 3: Unit 3 ready
- 15:01 Base: chat started

Below the chat log, there is a 'Base' field and a 'Start pub/sub' button. The window also has radio buttons for 'FIFO' (selected) and 'LIFO'. Another 'WS Invocator v. 2.3.3' window is open in the foreground, showing a 'Start Pub/Sub' button and a list of services: `car3Service, 2` and `car2Service, 1`. A small image of a soldier in a desert environment is visible in the bottom left of this window. The status bar at the bottom shows 'car3Service, Receive time: 15:49:48'.

Summary, we were able to interconnect mobile users deployed HQs using Web services for interoperability

Provides network level
interoperability.

Services provide application
interoperability.



Questions?