

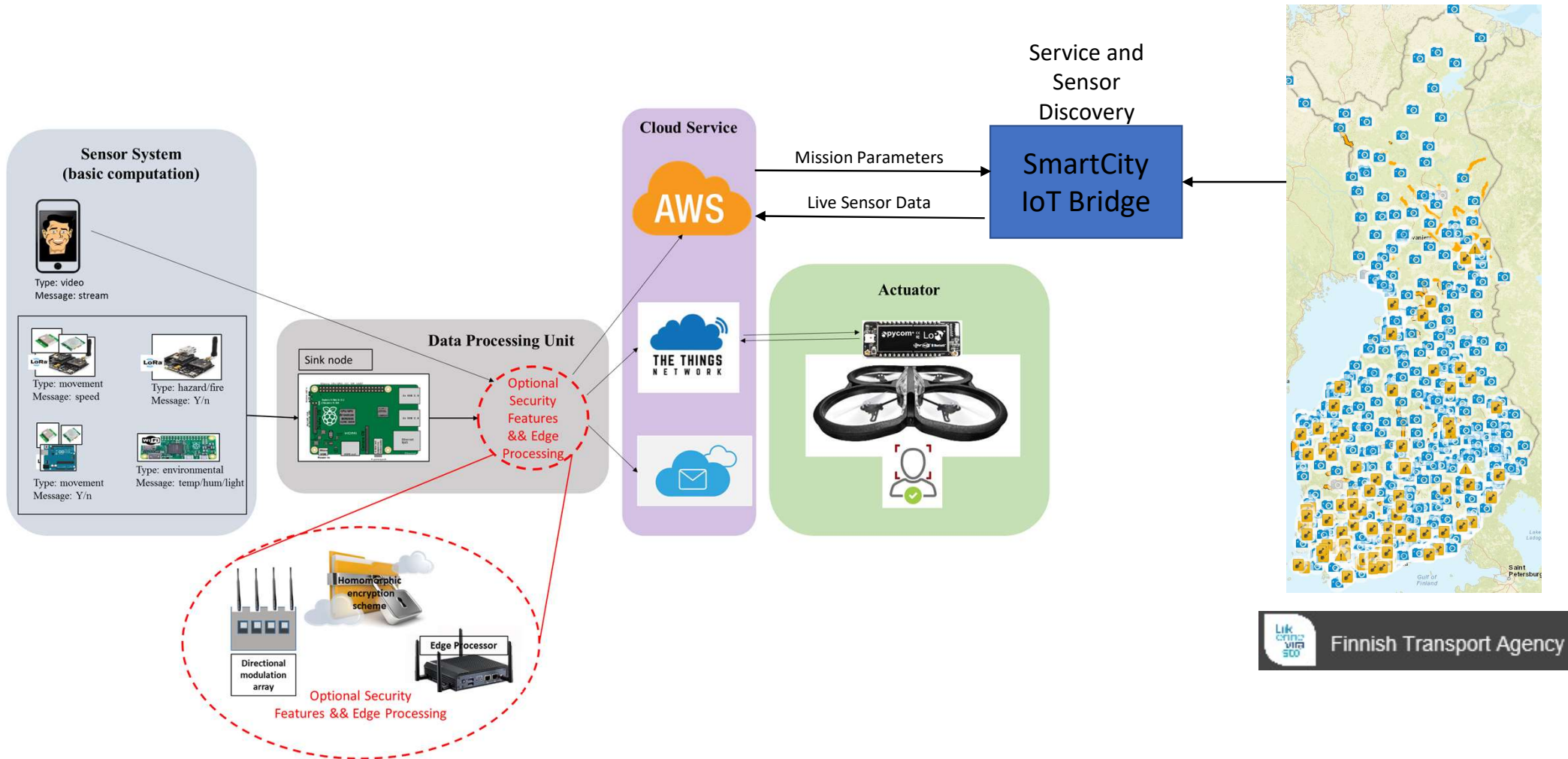


Heterogenous Federated IoT Systems for Public Protection and Disaster Relief Scenarios

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IoT and C2 integration



Things we connect

UNCLASSIFIED//CONTROLLED UNCLASSIFIED INFORMATION//DRAFT//PRE-DECISIONAL



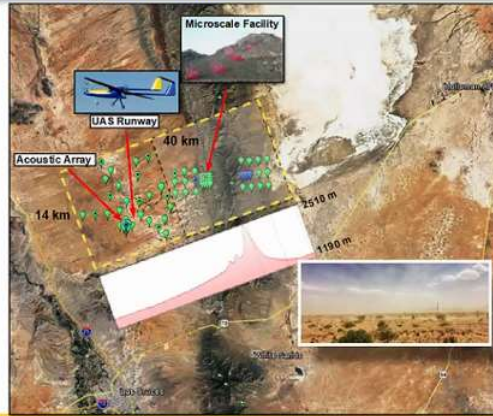
MULTI-PURPOSE SENSING AREA (MSA) DEVCOM

Integrated Empirical Evaluation

Fully-instrumented capability to execute collective sensing experimentation and evaluation, with mobility and spectrum effects, over broad geographically-distributed range and stand-off

ARL's Multi-Purpose Sensing Area (MSA)

- 14km x 40km, ARL shared-owned facility
- Low security concerns for profs and students
- Can operate UxVs & low power spectrum effects
- Natural characteristics for contested austere environment and MDO Effect Loop evaluation



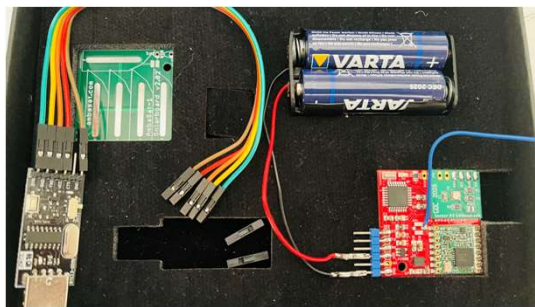
Fifty-One 30ft towers

- 15-20 heterogeneous sensors per tower
- Fully instrumented for longitudinal data collection
- Multi-Site network accessible over long distance
- Edge and command post system capabilities

Integration with Joint C2 systems

- Connects to containerized/virtualized C2 systems
- Provides immersive & 2D COP visualizations
- Emphasis on expeditionary C2 systems

IMPACT: Multi-Location distributed C2 experimentation capability with firewalled access to real systems. Provides knowledge products & future integrated multi-location experiments. Resource for integration with other experimental facilities



Data-Centric Security

NATO user at a secure terminal



Mobile NATO user



Enhanced partner sharing & reduced data duplication opportunity through ability to converge networks

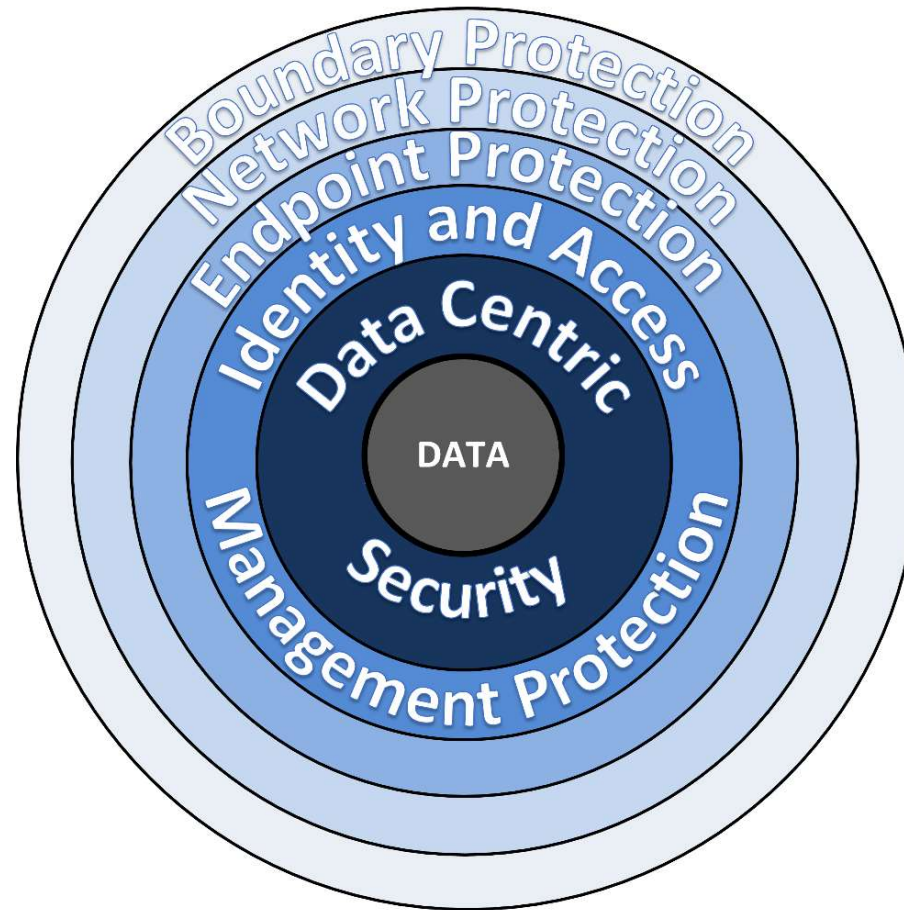
Partner CIMIC entities



Unauthorized access attempt



DCS: Enhancing traditional approaches

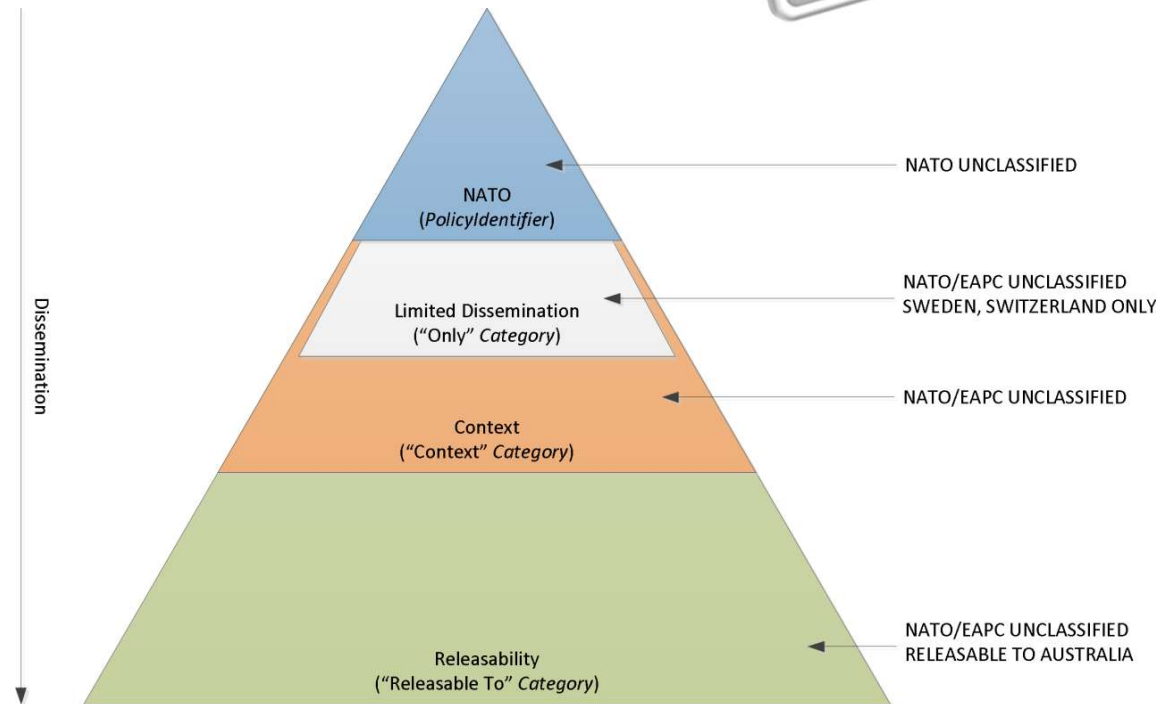


DCS 1 - Labelling of data: STANAG 4774



Benefits:

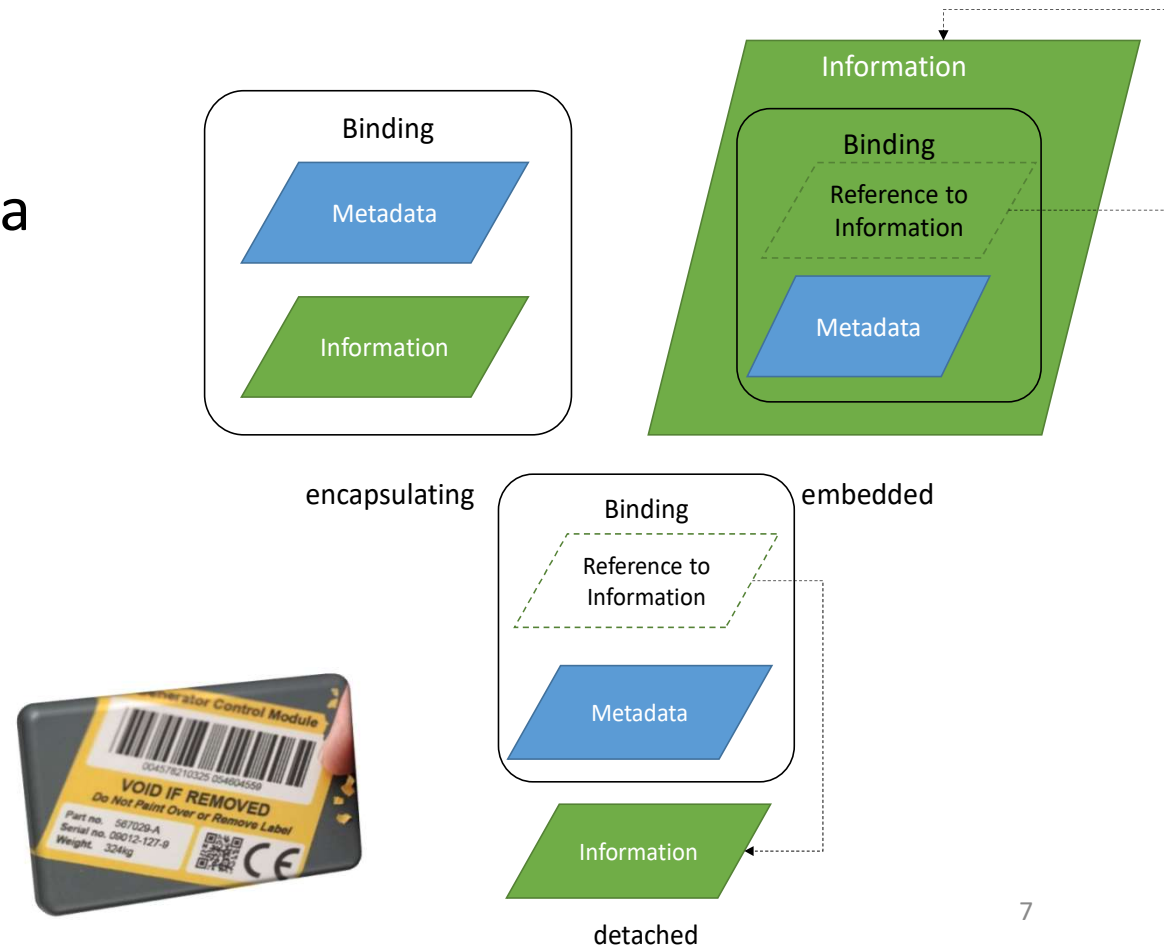
- Machine readable labels reduce need for human intervention and facilitate automation
- Standard syntax and interoperability between communities-of-interest (COI)
- Ability to make informed decisions about release and protection requirements



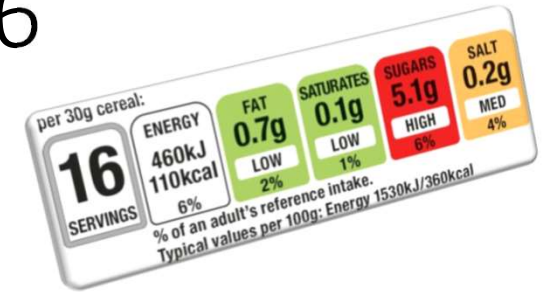
DCS 1 - Labelling of data: STANAG 4778

Benefits:

- Integral binding of labels to data facilitate trusted information sharing between security domains
- Tracking of provenance of data
- Support for legacy systems

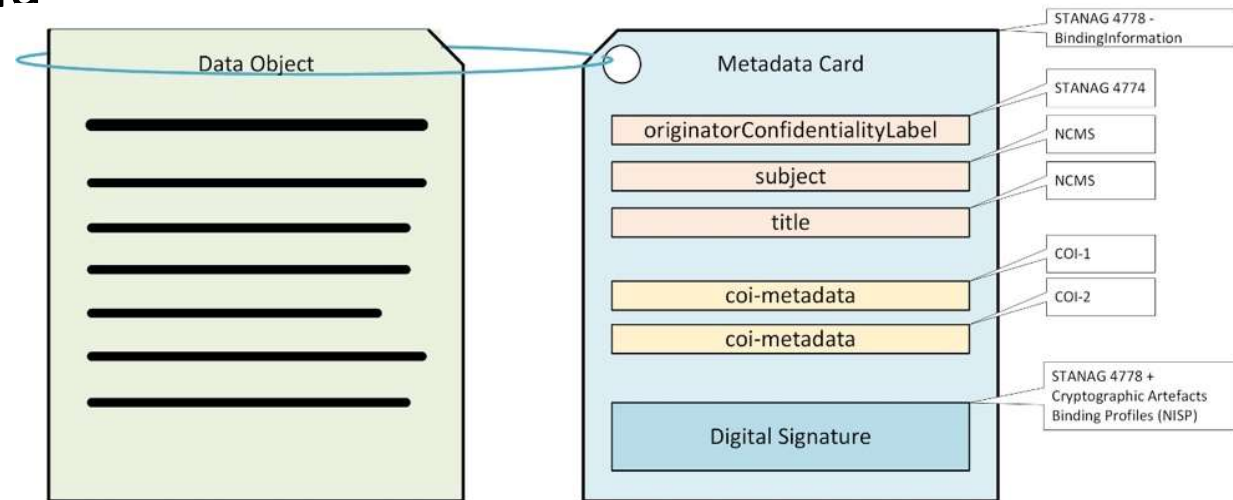


DCS 2: Rich metadata: STANAG 5636



Benefits:

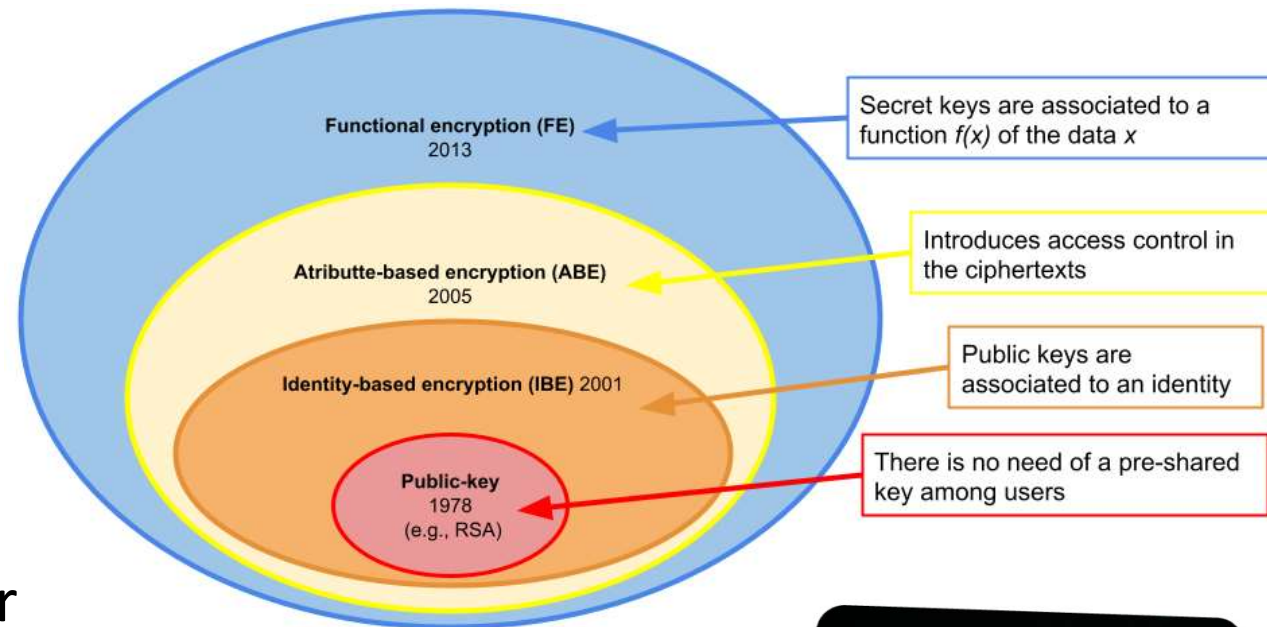
- Enabling role-based and attribute-based access control
- Metadata for information and knowledge management
- Support for COI-specific metadata



DCS 3: Cryptographic Access Control

Benefits:

- Access control through key management
- Ability to provide selective access to parts of data sets
- Data can be stored and processed in limited control environments, e.g. hybrid or public cloud



Optimized labelling formats

- New services require new formats
- XML – good for documents
- JSON – the choice for services and applications data
- CBOR – Internet of Things and constrained environments



Experimentation platform



Military University of Technology



IST-176

aws Services Search for services, features, marketplace products, and docs [Option+S] konrad.wrona @ N. Virginia

New EC2 Experience Tell us what you think

EC2 Dashboard New

Events

Tags

Limits

Instances

Instances New

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances New

Dedicated Hosts

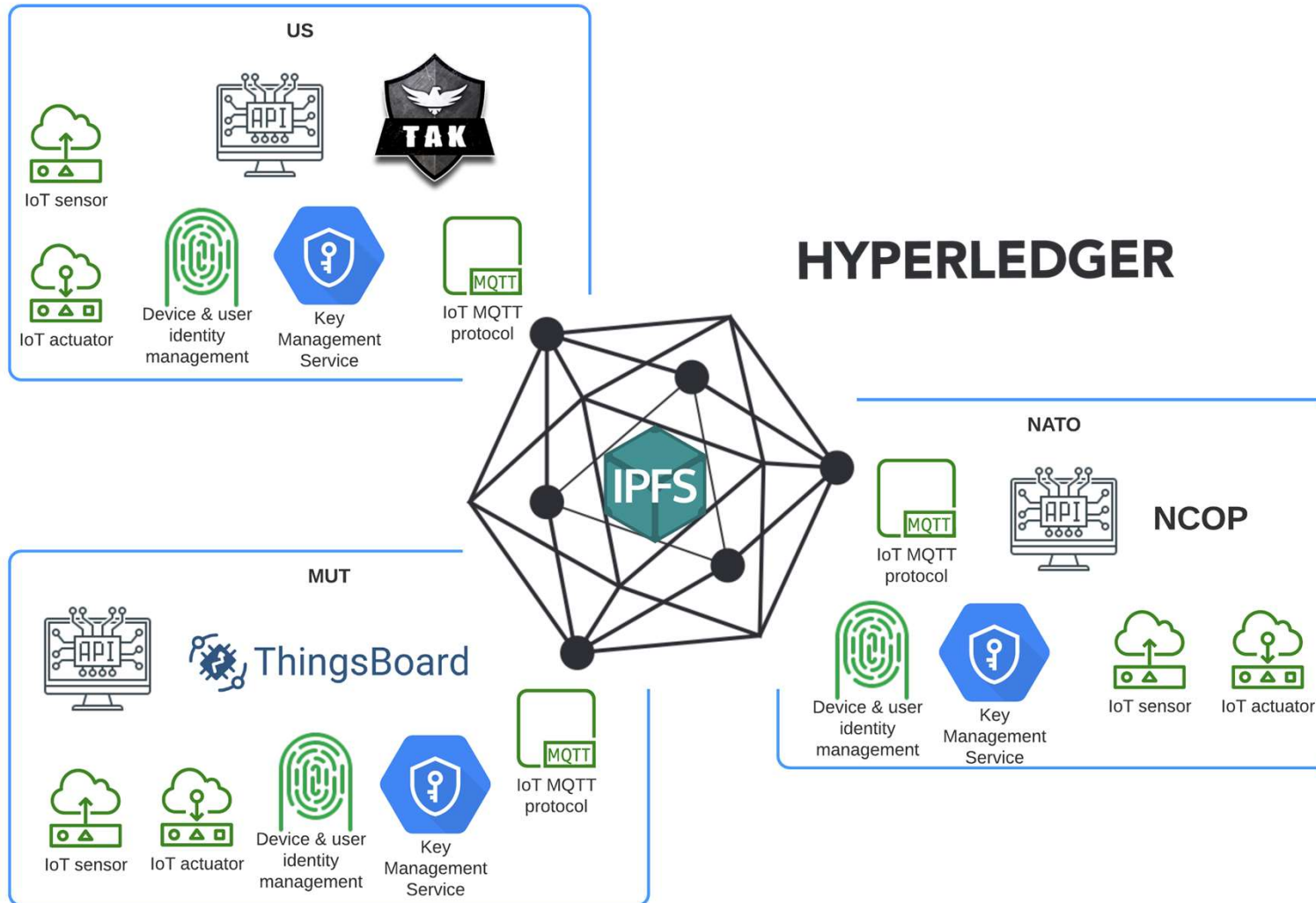
Instances (8) Info

Filter instances

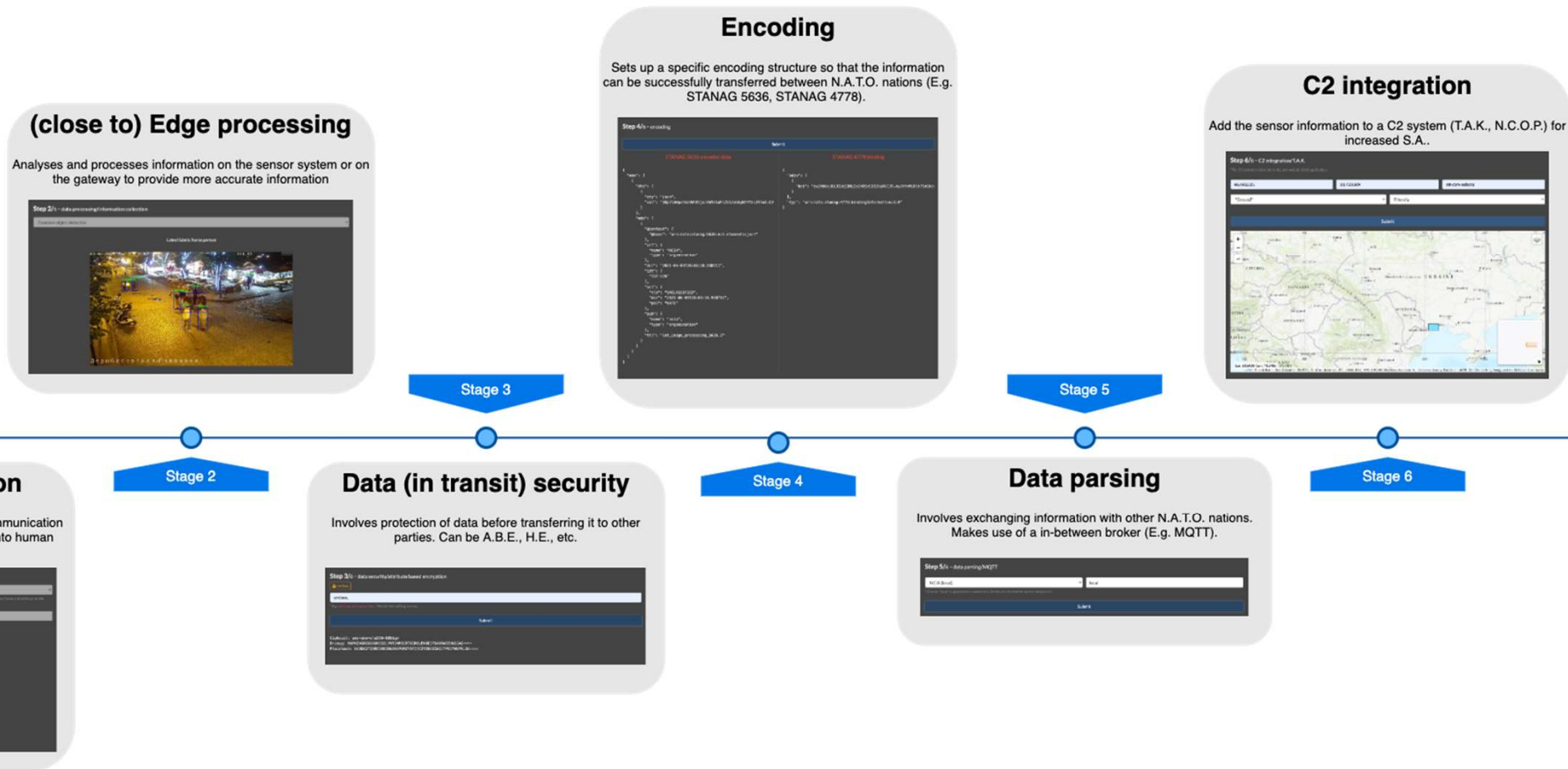
search: running Clear filters

<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Publ
<input type="checkbox"/>	CWIX21-MQTT-MIDDLEWARE		Running	t2.micro	2/2 checks passed	No alarms	us-east-1e	ec2-3
<input type="checkbox"/>	DVPG-linux-64-1		Running	t2.micro	2/2 checks passed	No alarms	us-east-1f	-
<input type="checkbox"/>	CWIX21-IoT		Running	t2.xlarge	2/2 checks passed	No alarms	us-east-1f	-
<input type="checkbox"/>	CWIX21-OpenVPN		Running	t2.micro	2/2 checks passed	No alarms	us-east-1f	-
<input type="checkbox"/>	CWIX21-ATAK-SERVER		Running	t2.medium	2/2 checks passed	No alarms	us-east-1f	-
<input type="checkbox"/>	CWIX21-WinTAK		Running	t2.xlarge	2/2 checks passed	No alarms	us-east-1b	ec2-5
<input type="checkbox"/>	bogdan-test-IPFS-node		Running	t2.micro	2/2 checks passed	No alarms	us-east-1b	ec2-5
<input type="checkbox"/>	CWIX21-UK-CBOR		Running	t2.micro	2/2 checks passed	No alarms	us-east-1b	ec2-3

In Things we trust



Moving securely from a Thing to the C2



Questions?

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