NCI AGENCY

NATO Communications and Information Agency

AFCEA Europe

The Association for Communications, Electronics, Intelligence & Information Systems Professionals

AFCEA

"From Assets to Services - Capability Delivery in the 21th Century"

25-27 March 2014 Bucharest, Romania

NATO C4ISR Industry Conference & TechNet International 2014

"on the occasion of the 10th anniversary of Romania's accession to NATO"

NATO Communications and Information Agency
Agence OTAN d'information et de communication

NATO's Journey to the Cloud – Vision and Progress

Dr Peter J. Lenk

Definitions of the Cloud

- *A large-scale distributed computing paradigm that is driven by economies of scale, in which a pool of abstracted, virtualized, dynamically-scalable, managed computing power, storage, platforms, and services are delivered on demand to external customers over the Internet.*
  Ian Foster, Yong Zhao, Ioan Raicu, Shiyong Lu, 'Cloud Computing and Grid Computing 360-Degree Compared'

- *Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.*
  US Department of Commerce, national Institute of Standards and Technology (NIST)

- *A business model that allows for:*
  - *the delivery of commodity IT services,*
  - *in an efficient, and scalable way,*
  - *through the pooling and abstraction of resources.*

Cloud computing is not a technology, it is a computing business model

Cloud

Characteristics:
- Scalable and elastic
- Resource pooling
- Internet technologies
- Metred usage
- Service based

Models
- Public; e.g.,
  - Google
  - Amazon
  - SalesForce
  - Azure
- Private
  - Off premises
  - On premises
- Community
- Hybrid
- Personal

Benefits ☺
- Agility
- Cost
- Focus
- Self-service
- Innovation

Worries ☹
- Security
- Transparency
- Assurance
- Interaction
- Lock-in

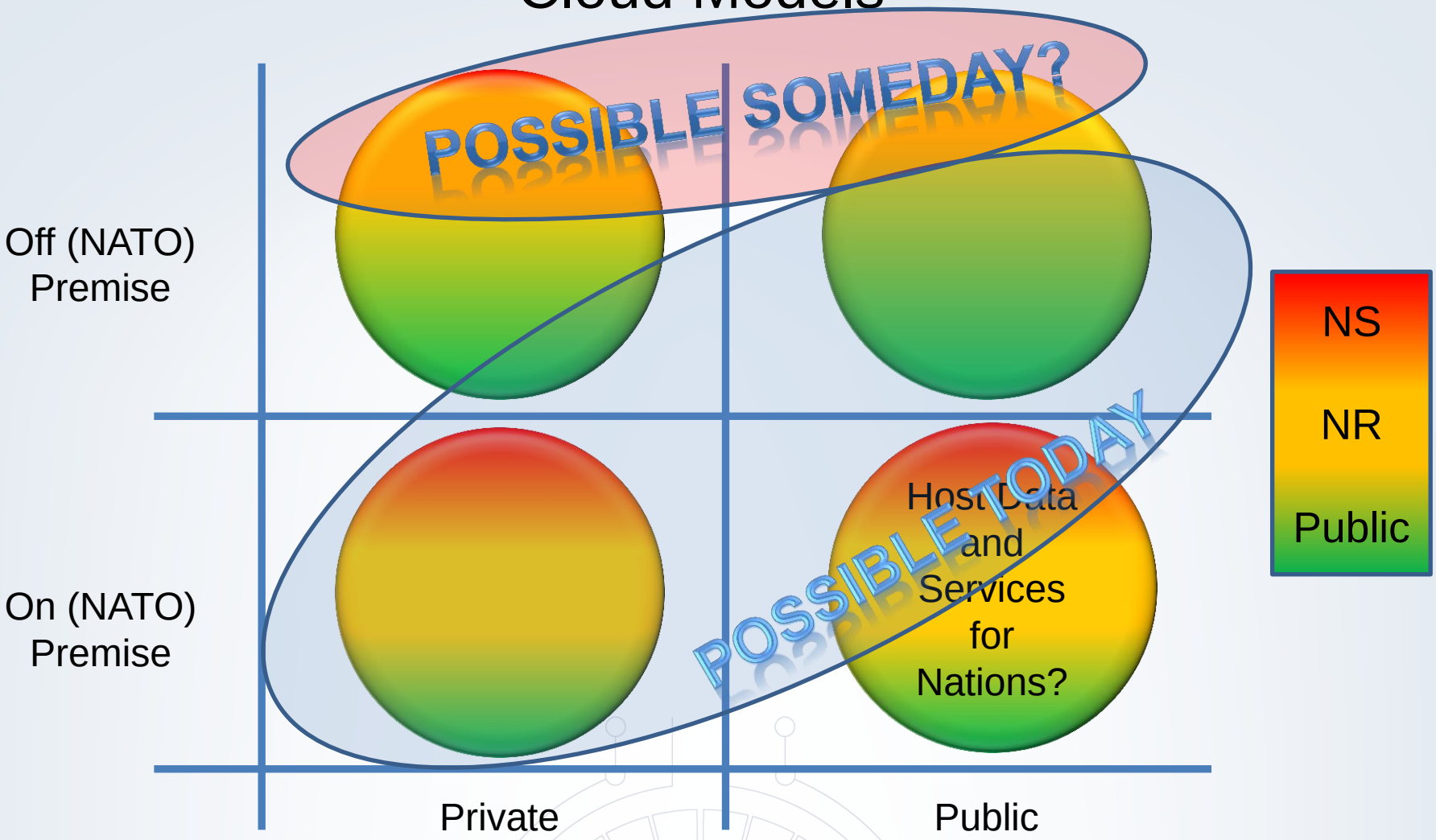
Cloud computing will be 'just computing' by 2018 (Gartner)

Operational Benefits of the Cloud In a NATO / Military Environment

- Operational effectiveness gains:
  - Increase the availability of IT services
  - Enhance the Business Continuity (BC)
  - Enhance Disaster Recovery (DR) posture
  - Enhance the Information Security posture
  - Increase operational agility & flexibility
  - Universal access to services and data
    - Increase mobility and flexible working
  - Metered usage - transparency of costs
  - Standardisation
    - Levels of performance
    - Training
- Efficiency gains:
  - Reduce the manpower required to provide & maintain services
  - Better sustainability
  - Reduce life-cycle costs

Centralisation, Standardisation, Pooling, Automation

Cloud Models



STEP 1: IT MODERNISATION INFRASTRUCTURE AS A SERVICE

To-Be Architecture

IT Modernisation
The Journey

Today – Local

- Local Resources
- Local Processes
- Local Applications
- Local People
- Non-Standardised HW & SW
- Low Resilience
- Stove piped funding

-> Supporting Local Users

Tomorrow – Pooled

- Pooled Resources
- Common Processes
- Central Management
- Shared Applications
- Standardised HW & SW
- High Resilience
- Enterprise Funding

-> Supporting all Users

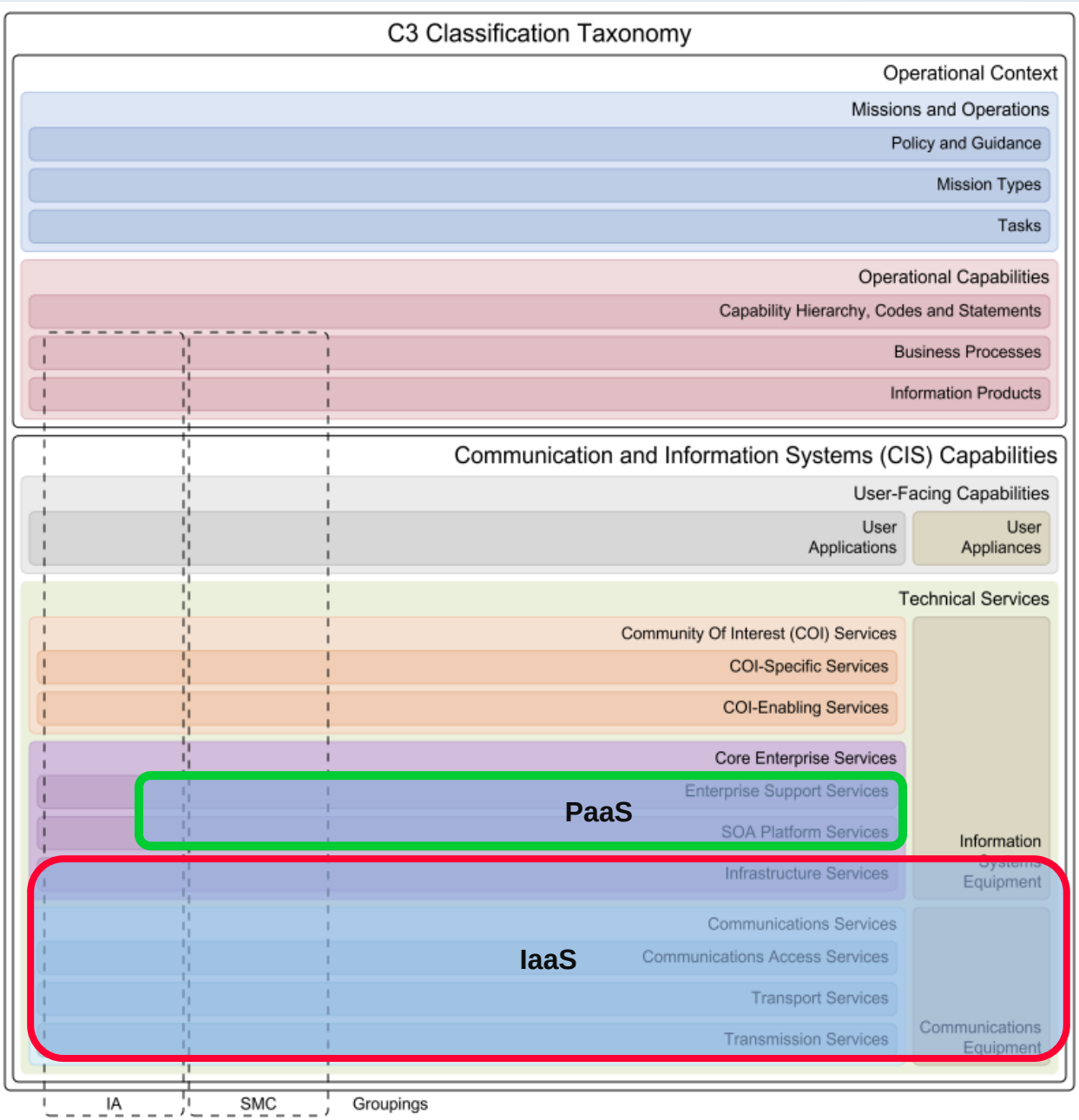
STEP 2: MOVING FROM INFRASTRUCTURE TO PLATFORM AS A SERVICE

Platform as a Service

- No good definition – lots of diverse PaaS offerings
- Usually includes:
  - Integration middleware
  - Identity and access management
  - Databases / data store
  - Deployment tools
  - Management tools
- May include:
  - Application development
  - Analytics
  - Mobile device management,
  - Etc.

IaaS & PaaS in the Context of the NATO C3 Taxonomy

- Narrow definition of PaaS:
  - Integration middleware
  - Identity Management
  - UCC services
  - Web hosting
  - Portal services
- Common set of services deployed, ready for applications to build against
- Application developers can focus on business logic



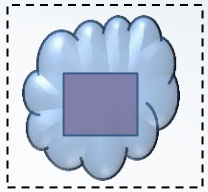
STEP 3: THERE IS NO STEP 3

SOME THOUGHTS ABOUT WHAT MIGHT BE NEXT: HYBRID CLOUDS, AND MORE

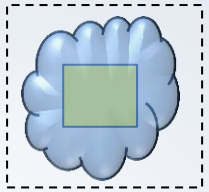
NATO's Journey to the [Hybrid] Cloud: Example 1

Users

Public Cloud(s)



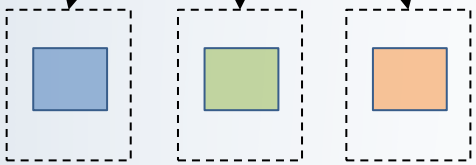
Cloud Provider 1
HR

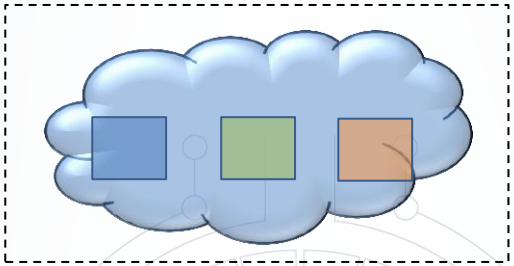


Cloud Provider 2
CRM

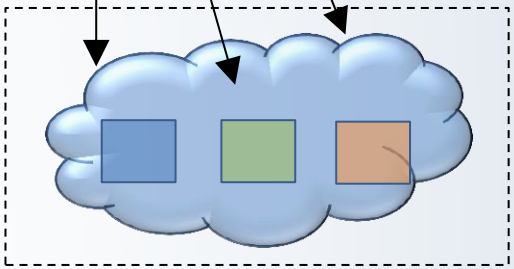
Cloud Provider 3
Capacity

Cloud Broker





?



Today
- Discrete Services
- Discrete Infrastructure
- Locally Provided

After IT Modernisation
- Private, on premises Cloud
- Common Infrastructure Services
- Some Common User Services

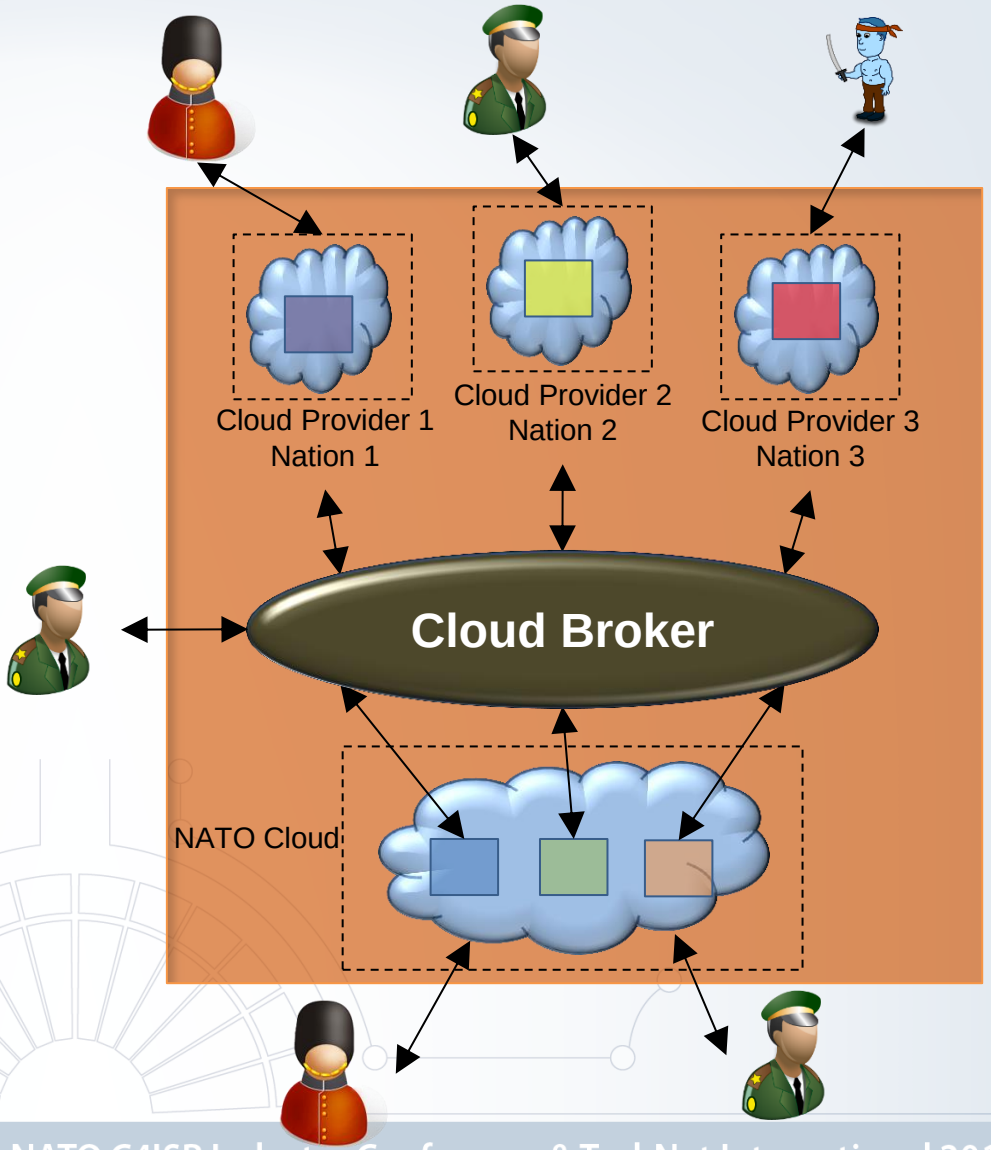
Tomorrow
- Hybrid – Cloud Broker
- On Premises Services
- Off Premises Services

Cloud Broker

- An intermediary (software or entity / agent) between the user and the service, that adds business value by:
  - Providing service governance;
    - Screening sources;
    - Selecting sources;
    - Securing services;
    - Managing vendors;
    - Etc.
  - Aggregating – common access to services;
  - Integrating – creating new services; or
  - Other Value Added Services (VAS)

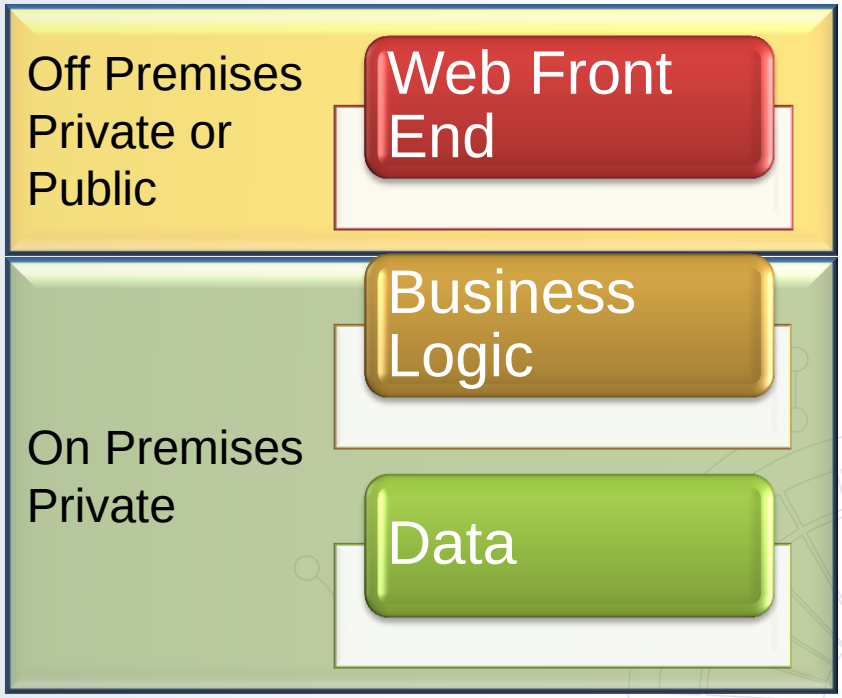
The ‘Intercloud’: Example 2
Coalition Deployment – A Cloud Federation

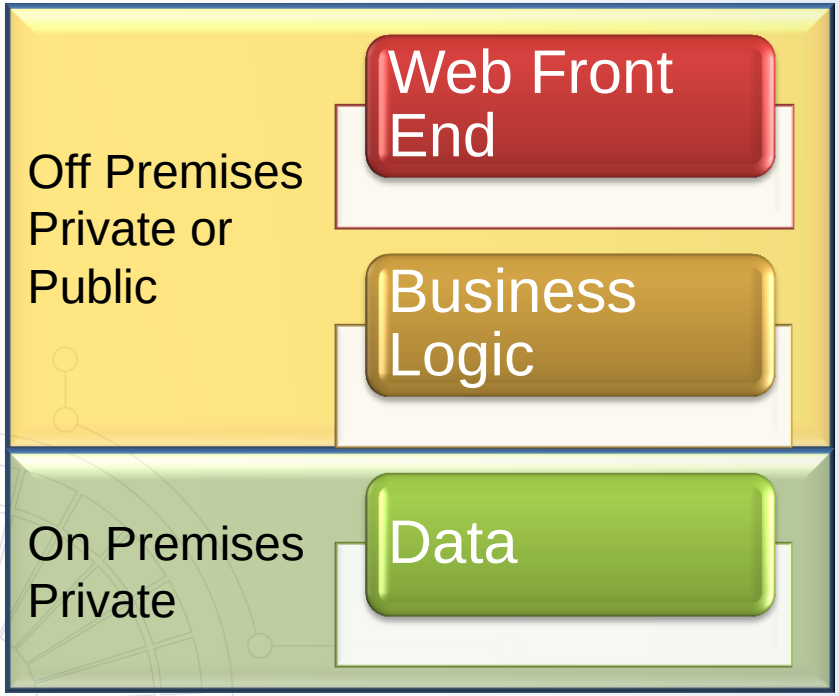
- Share resources across federation, allocating / surging to satisfy priorities dynamically
- Nations can share services, bringing services to the fight, or not
- We may need a ‘service generation’ process in order to make sure we have coverage of the needed services
  - Mission Service Catalogue



Tiered Services: Example 3

- In some situations it may be acceptable to put some tiers of a service in an off premise or even public cloud, while other tiers are held on premises
- On the left, only the web front end is off premises. In some cases the business logic might also be considered for off premise hosting, illustrated on the right





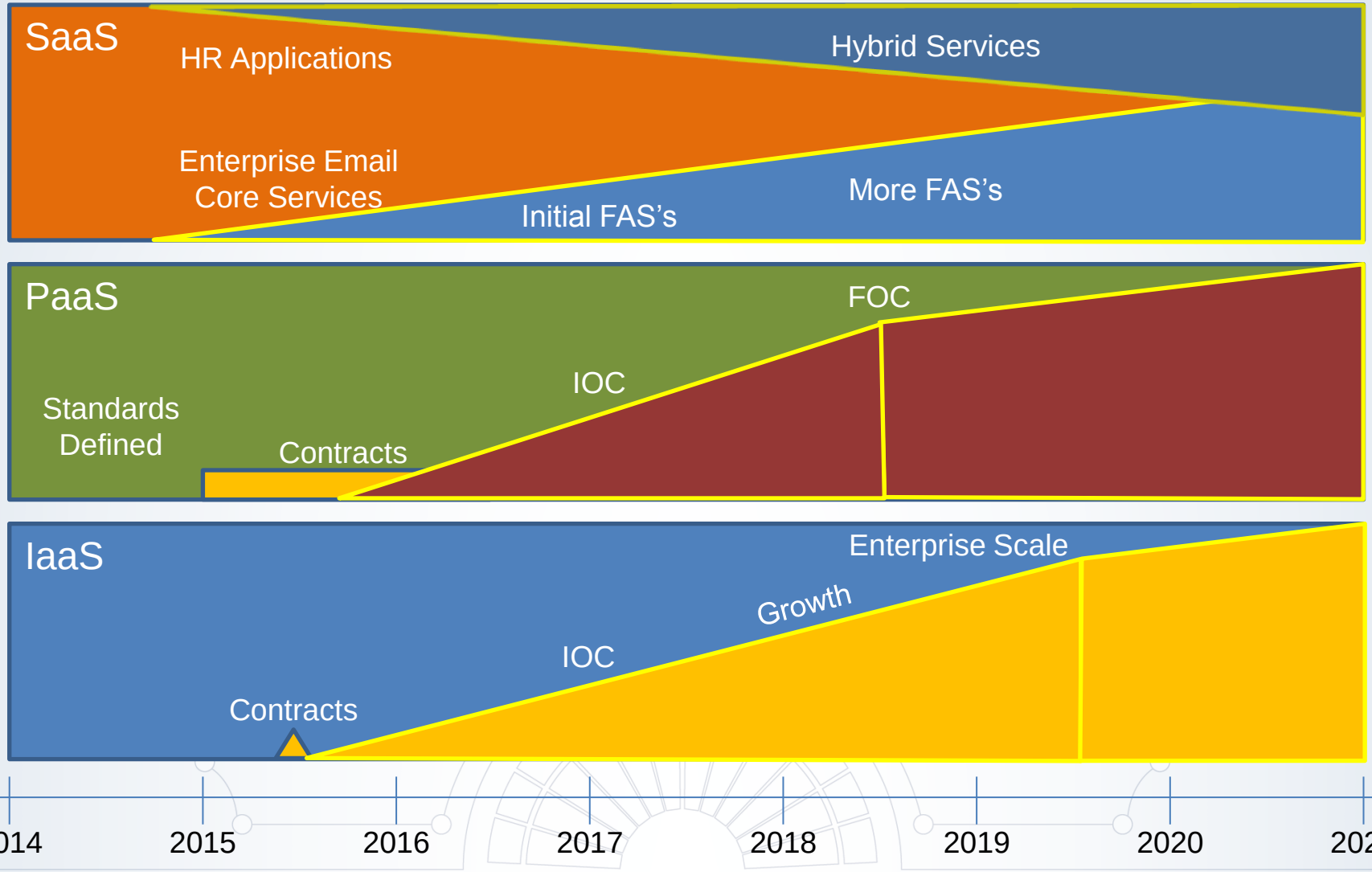
Personal Cloud

- Key Characteristics
  - Universality of access:
    - Any device
    - Any where
    - Any data
    - Any service

    -> But same / similar experience
- Why should NATO care?
  - Drive technology choices and design
    - HTML 5, CSS, etc.
  - ‘Appification’ of processes
    - Bite sized chunks
  - Context awareness
    - Location, situation, adjust to this
  - Rate of change / update
    - Days, or hours, or seconds, rather than yearly update cycle
  - Security
    - Secure data, not devices

THE ROADMAP FOR THE JOURNEY

Roadmap:
NATO's Journey to the Cloud



Barriers / Worries / Open Issues

- NATO policy makes it difficult to put sensitive data into a public cloud
  - So how will we leverage the benefit? Can we leverage a hybrid?
  - NATO is not a big organisation; some of the economies of scale may not fully apply in a private cloud environment
- Services that NATO may desire may not be available in an on premise or even private cloud
  - ‘Cloud-only’ services are becoming common
  - What happens when critical applications appear in or move to a cloud-only model? How will NATO deal with this?
  - Will a NATO private model become unaffordable?
- In order to make cloud federation work, need to agree standards
  - Open standards are under development
- Procurement processes
  - We do not have the mechanisms in place to deal with the dynamics of the future

Questions?