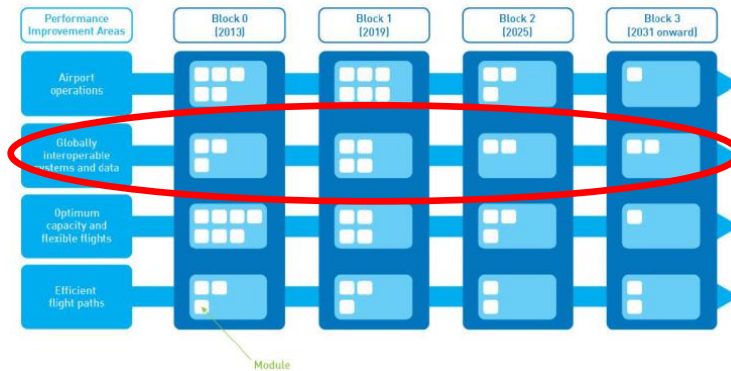# SWIM in SESAR "State of Play"

ICAO SWIM Workshop
Bangkok 16/05/16

Pedro Fernandez
EUROCONTROL

EUROCONTROL

Alignment with ICAO

GANP

Global Interoperable Systems and data

Enabling ATM Applications

Doc 10039 AN/511

MANUAL ON SYSTEM WIDE INFORMATION MANAGEMENT (SWIM) CONCEPT

Services

Information
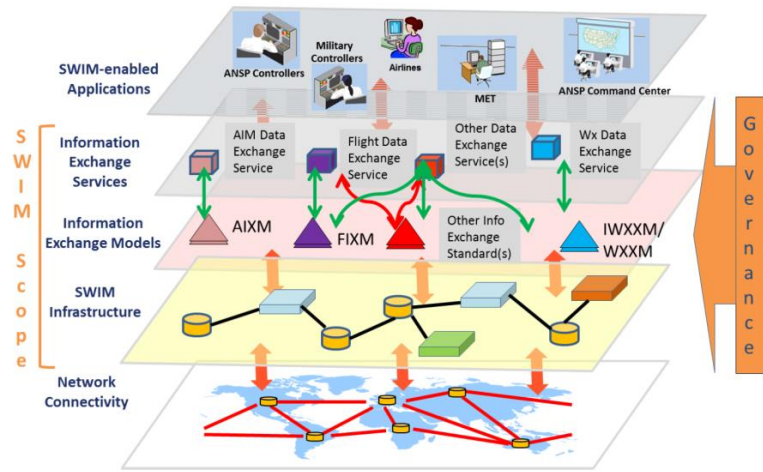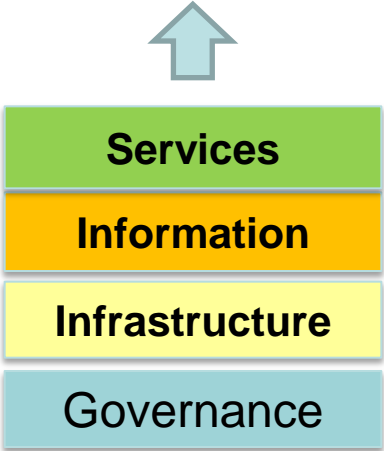
Infrastructure

Governance

Figure 2. SWIM Global Interoperability Framework

SESAR SWIM

SWIM

Increased need to exchange information at lower cost

Airspace fragmentation cost €4 billion a year

33k flights per day => 50k (2030)
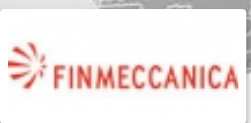
What is SWIM?

More Information Shared, Lower Cost, Higher Trust

exchange of information

Based on

Standards Policies

Services (Operational Interaction Specifications)

Information (Semantics and Syntax of ATM data)

Infrastructure (Technology Specifications)

Collaboratively Manages

SWIM Governance

SWIM: Meets ATM Requirements
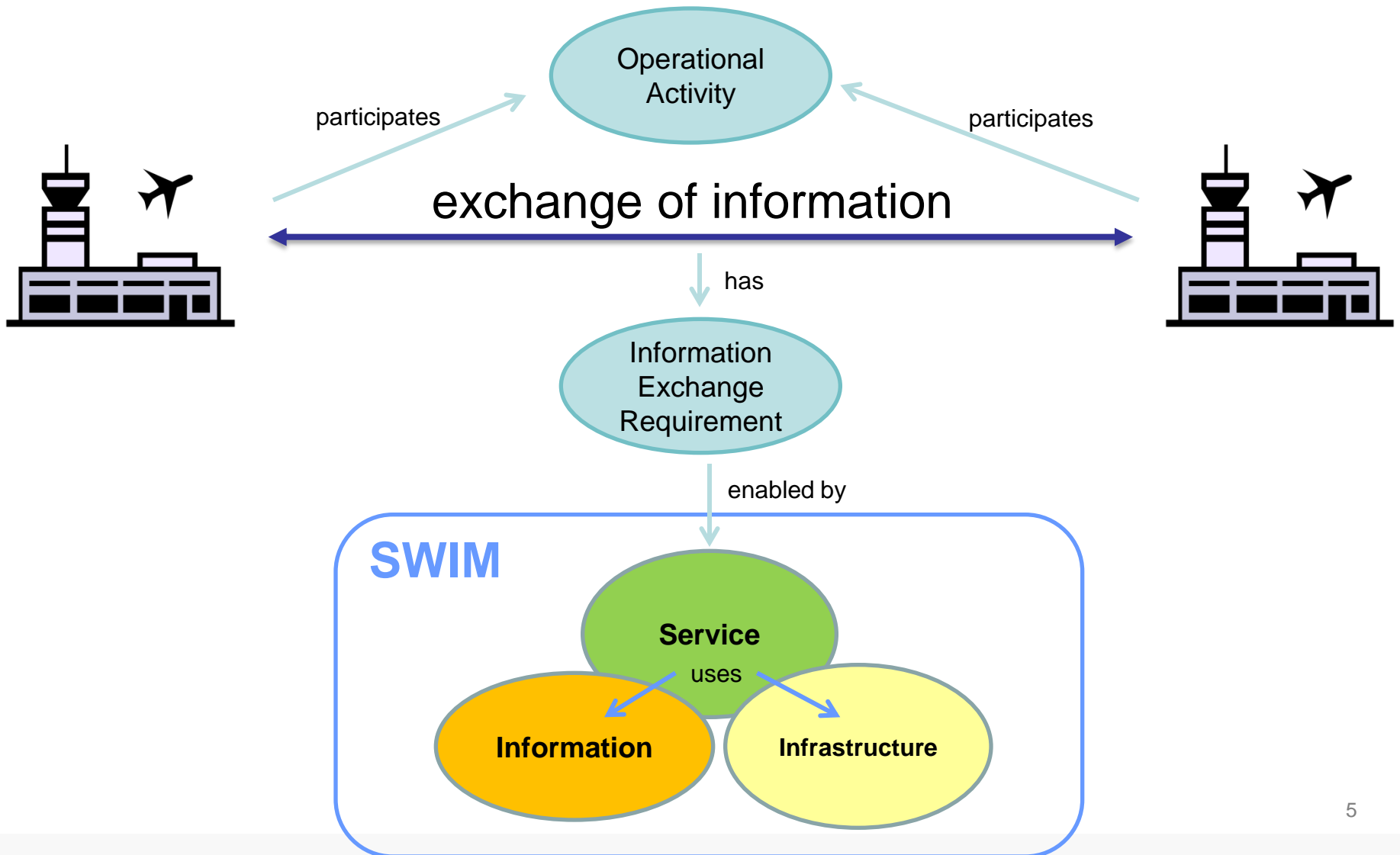
Services
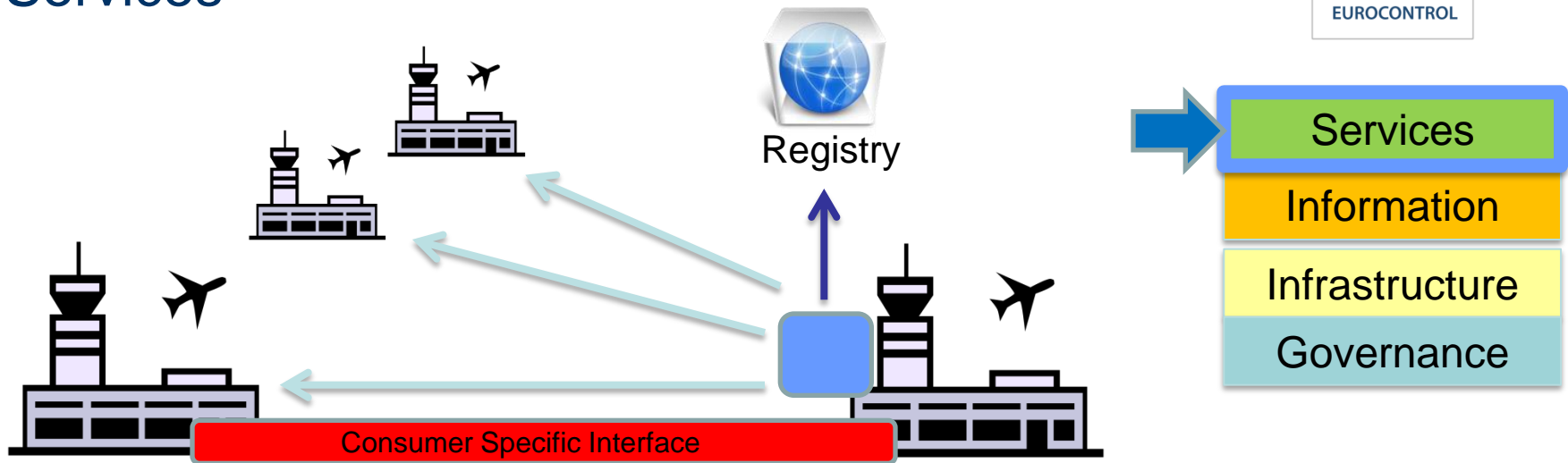
- Service Oriented Approach (Widespread Design Method)
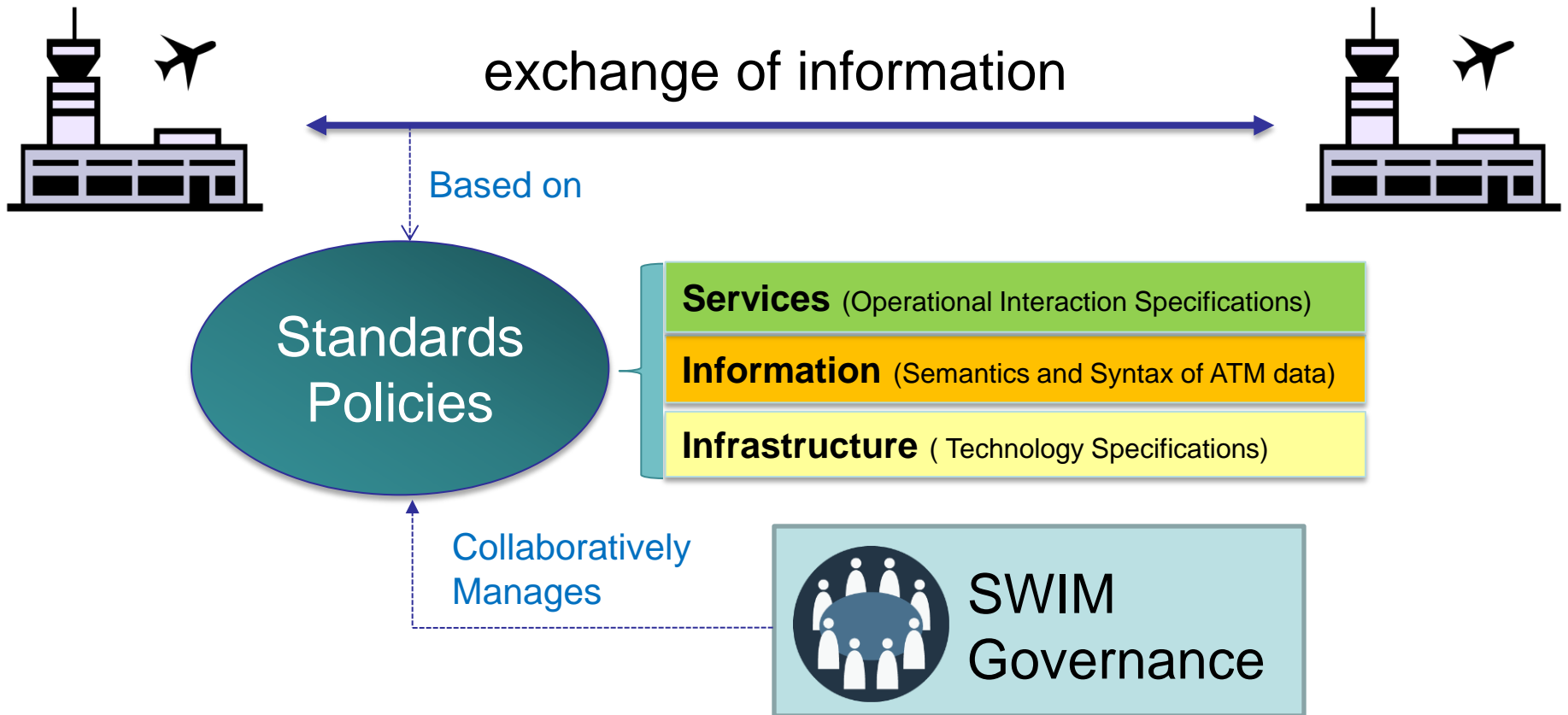
  - Loose coupling, Reusable

  - Standardized contract
    - Interface: Operations, Messages
    - Access Mechanisms
    - SLA

  - Discoverable (Registry)

  - Business Relevant (Traced to operational activities)
    - Based on Information Exchange Requirements

Services Registry

1000+ Users

100+ Organizations

70+ Service Implementations

Service Design Models

Service Model

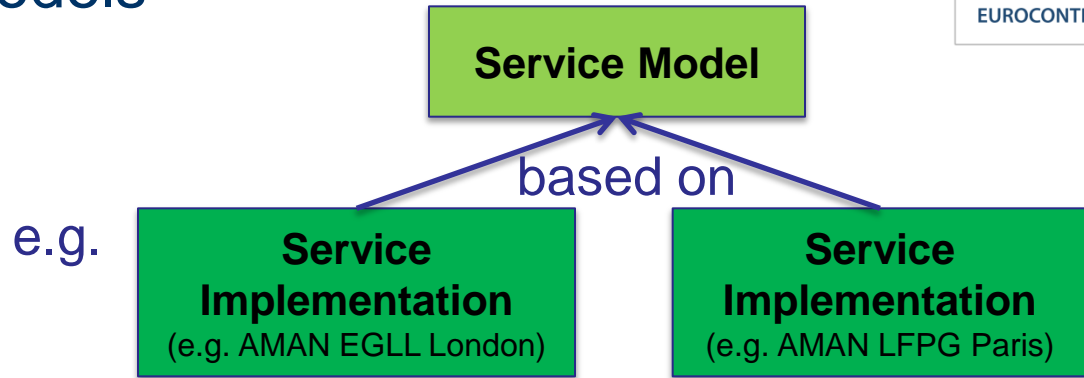based on

e.g.

Service Implementation
(e.g. AMAN EGLL London)

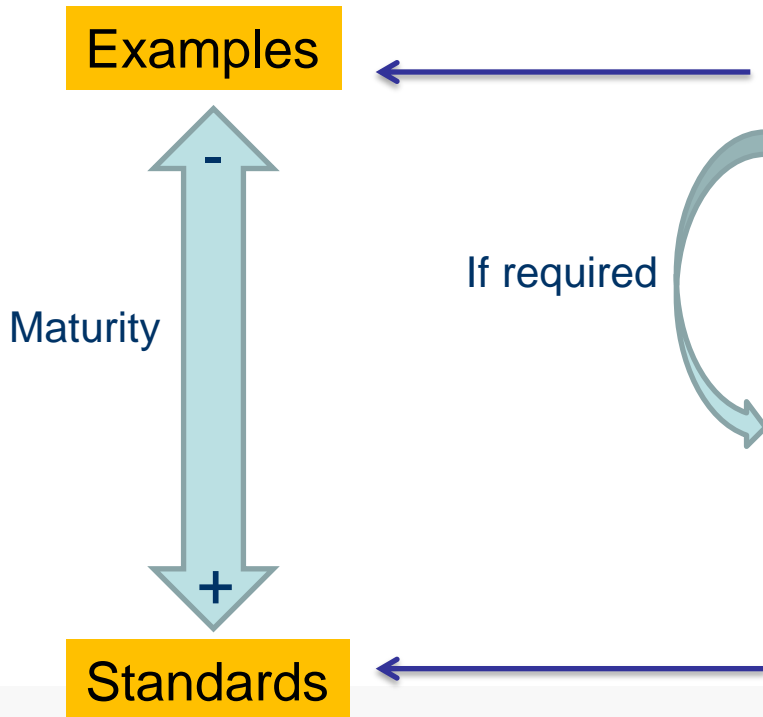**Service Implementation**
(e.g. AMAN LFPG Paris)

SESAR Program:

- 40+ Service Models
  - ATC Flight Object
  - AMAN
  - Flight Plan Management
  - …

Standardization:

- AMAN, Flight Object (ED133)

Examples

Maturity

-

+

If required

Standards

Information

Services
Information
Infrastructure
Governance

AIXM	WXXM	FIXM	Others
global adoption Digital NOTAM	I(CAO)WXXM Data is coming	ATMRPP AB to CCB V4(9/16) Stable Release	AIDX, AMDB, Asterix, …

AIRM

Consistent semantics across information domains
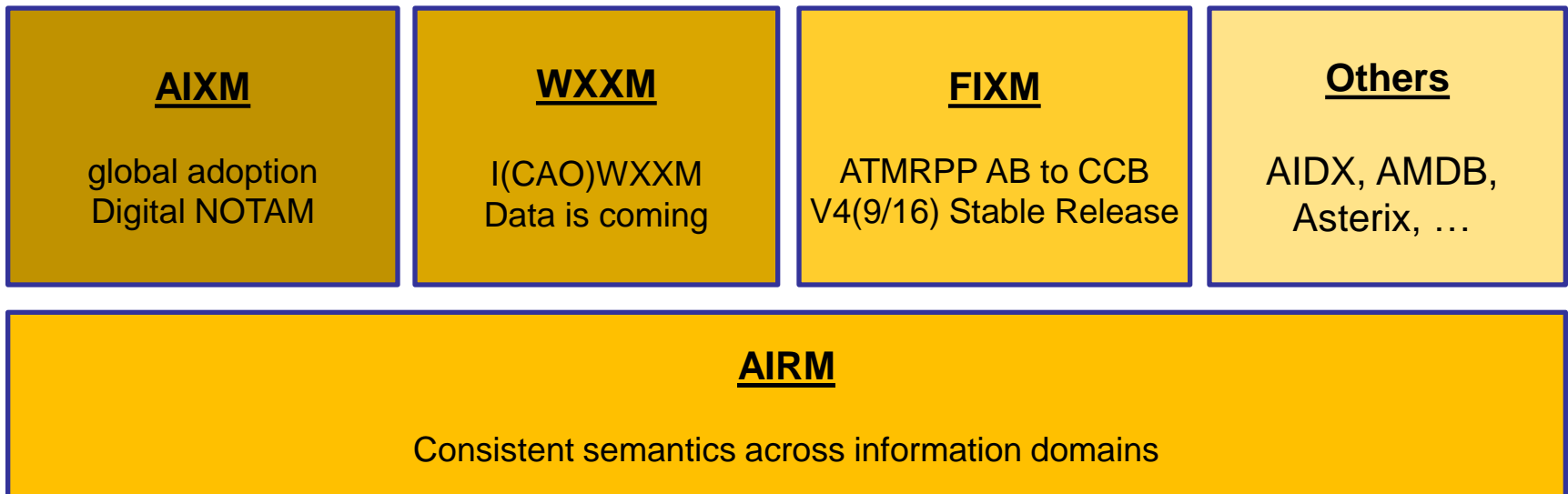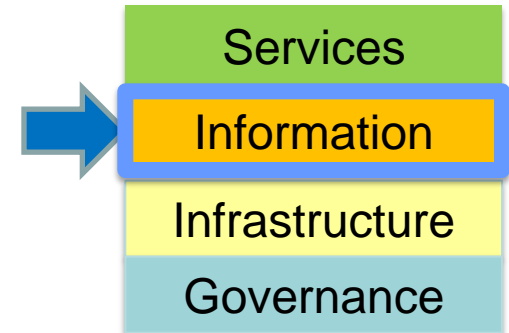
Information

- AIRM Model (Semantic Interoperability)

  e.g. Flight Phase in AIRM

Services

Information

Infrastructure
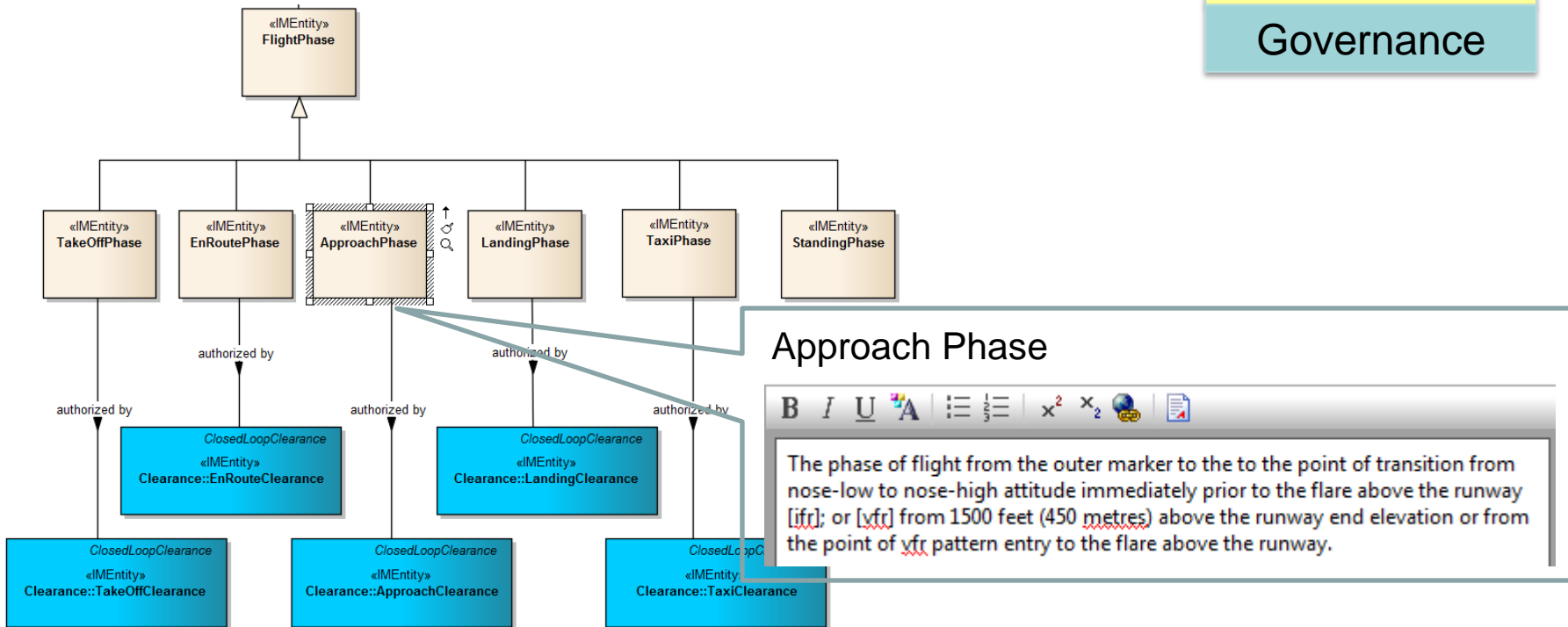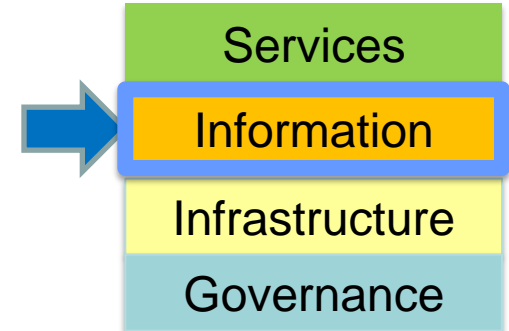
Governance

Approach Phase

The phase of flight from the outer marker to the to the point of transition from nose-low to nose-high attitude immediately prior to the flare above the runway [ifr]; or [vfr] from 1500 feet (450 metres) above the runway end elevation or from the point of vfr pattern entry to the flare above the runway.

Technical Infrastructure

SWIM TI uses

IP based Network
(Internet, PENS)

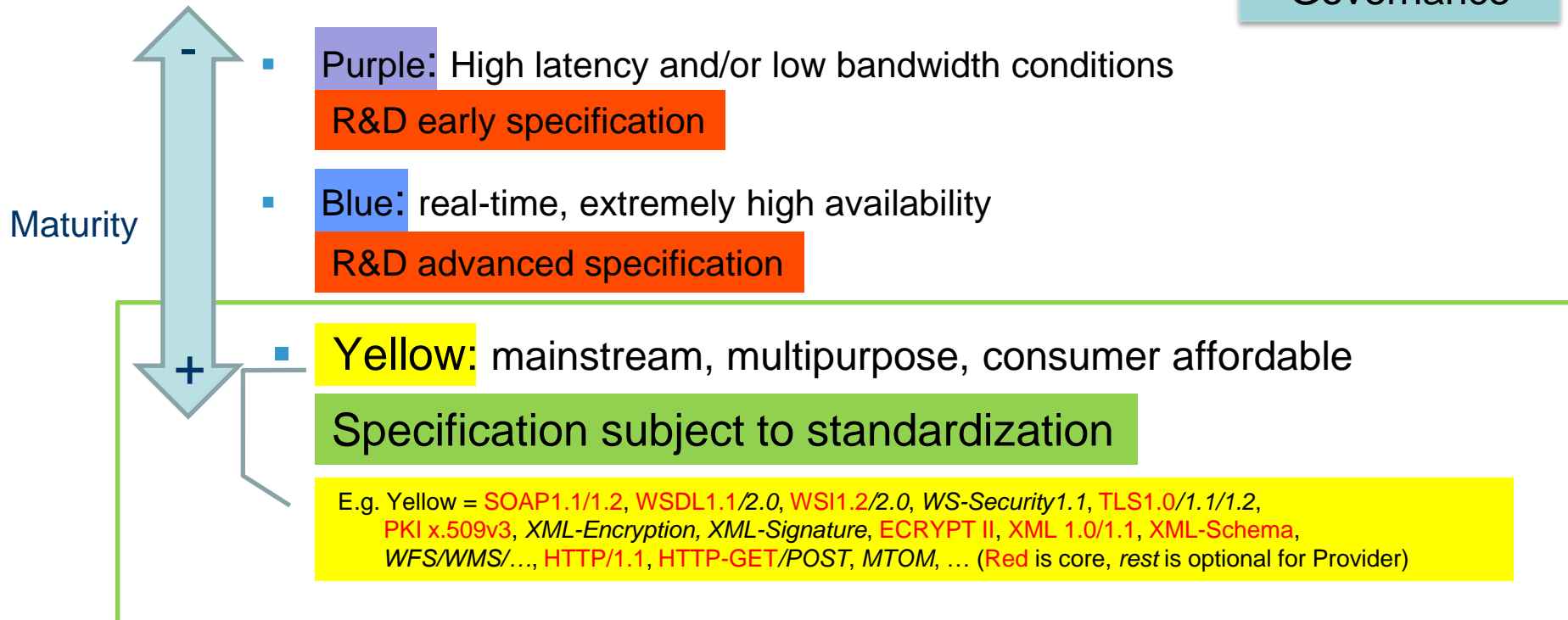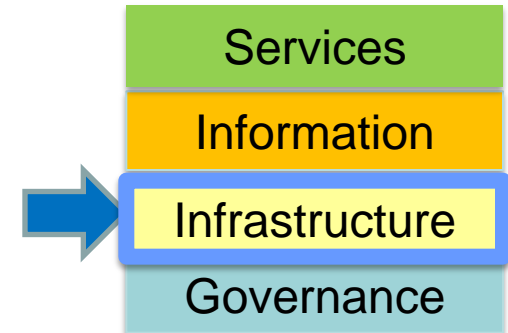| Services |
| Information |
| Infrastructure |
| Governance |
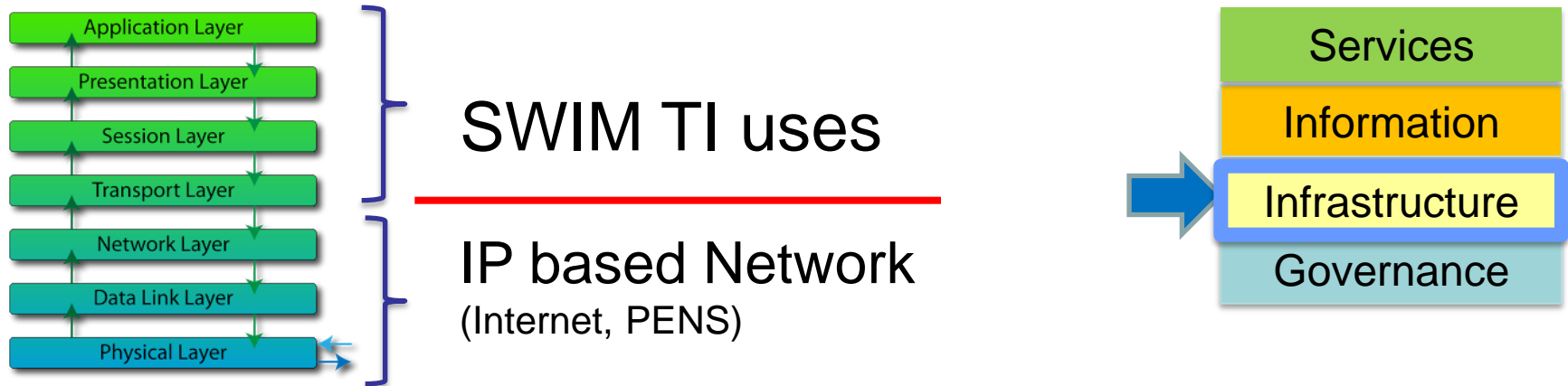
Functionality:

- **Messaging** (e.g. Distribution, Routing, Transformation,…)
- Security
- Recording,
- Supervision
- …

Infrastructure

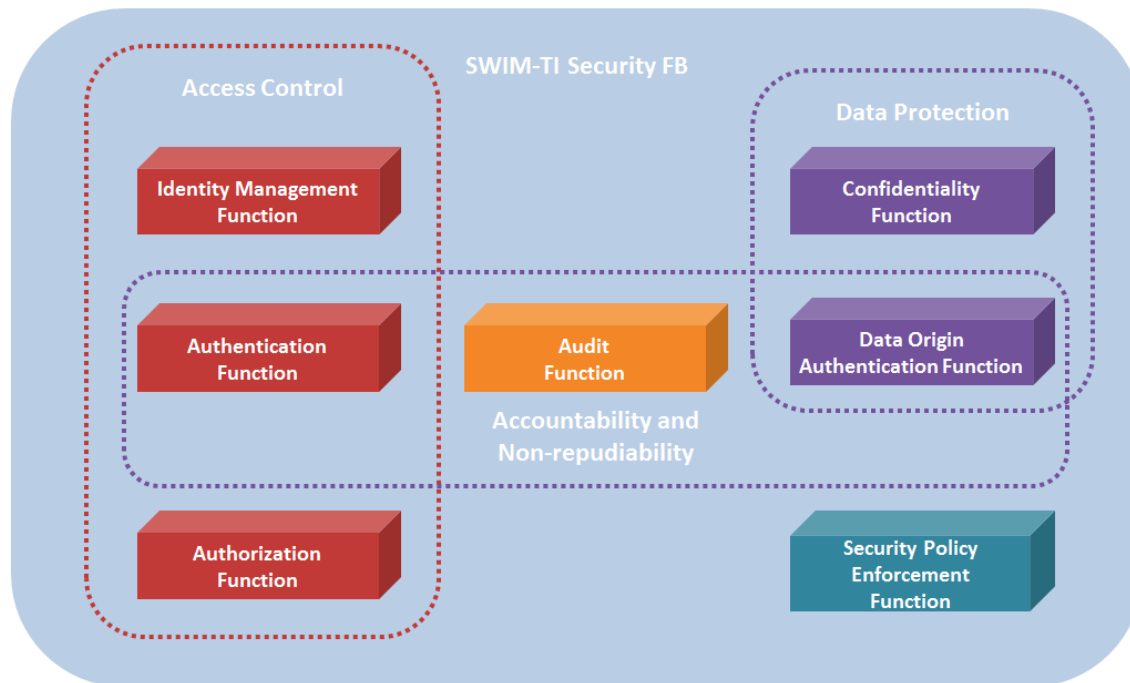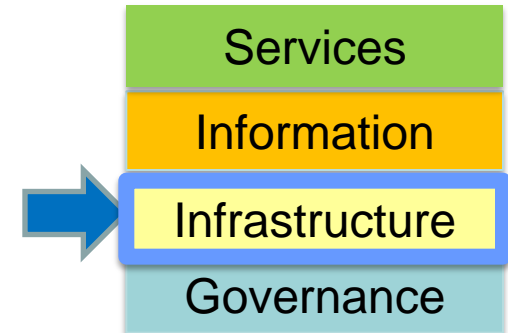## "One size does not fit all": TI Profiles

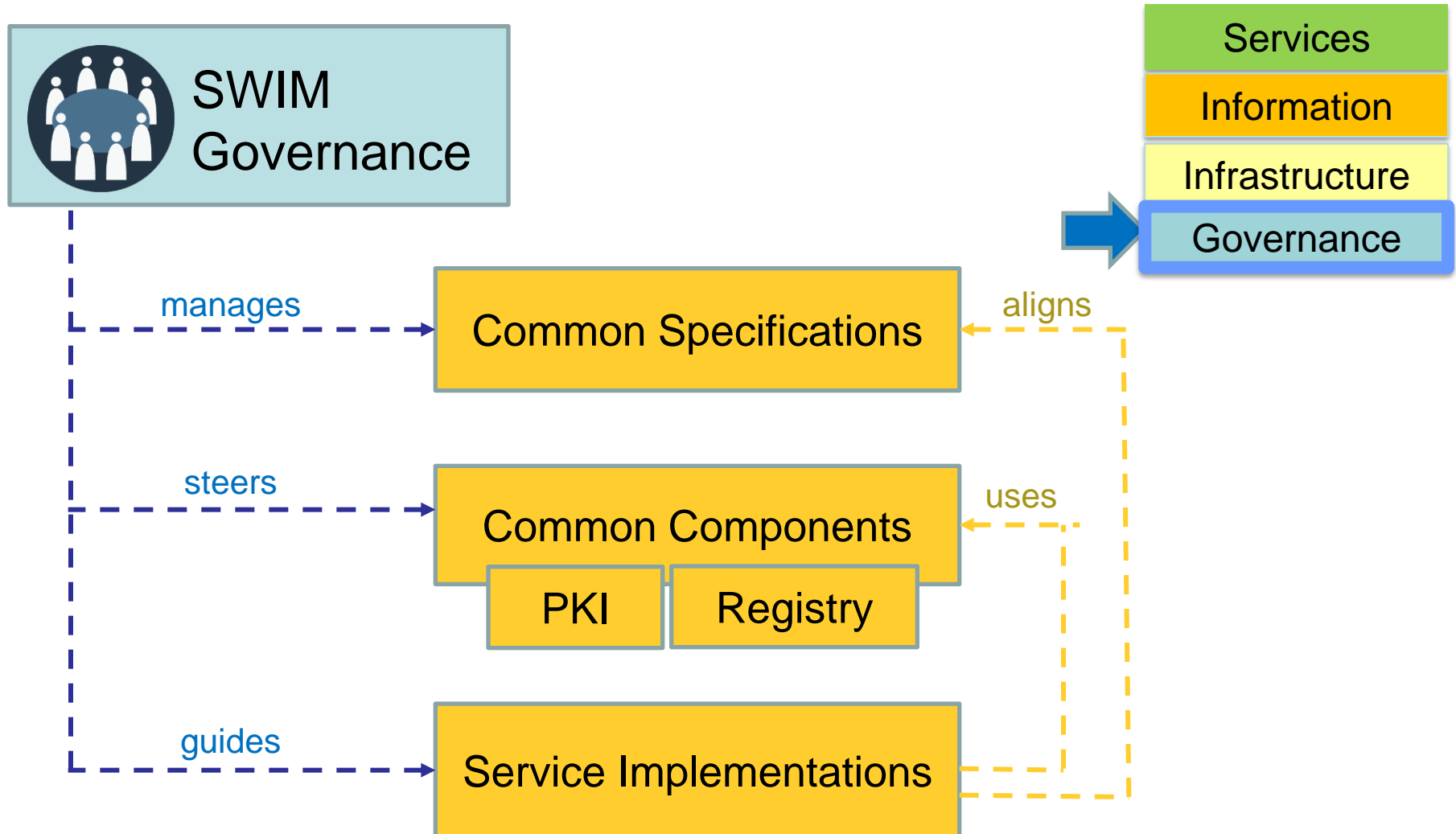TI Profile: Infrastructure requirements including transport protocols

Services
Information
Infrastructure
Governance

Maturity (−)

- Purple: High latency and/or low bandwidth conditions
  R&D early specification

- Blue: real-time, extremely high availability
  R&D advanced specification

(+)

- Yellow: mainstream, multipurpose, consumer affordable

Specification subject to standardization

E.g. Yellow = SOAP1.1/1.2, WSDL1.1/2.0, WSI1.2/2.0, WS-Security1.1, TLS1.0/1.1/1.2, PKI x.509v3, XML-Encryption, XML-Signature, ECRYPT II, XML 1.0/1.1, XML-Schema, WFS/WMS/…, HTTP/1.1, HTTP-GET/POST, MTOM, … (Red is core, rest is optional for Provider)

Infrastructure Security

- *The infrastructure will implement functions that secure information exchanges :*

Governance

EUROCONTROL

SWIM Governance		Services
		Information
		Infrastructure
	→	**Governance**

SWIM Governance

— manages → **Common Specifications** ← aligns —

— steers → **Common Components**
  | PKI | Registry |

  ← uses —

— guides → **Service Implementations**

SESAR Steps

Regulated

COMMISSION IMPLEMENTING REGULATION (EU) No 716/2014

EUROCONTROL SWIM STANDARDS

Standardized

EUROCONTROL

European Air Traffic Management Master Plan

Edition 1 - 30 March 2009

Deployment Phase
- Implement results of development to meet performance targets

Development Phase
- Develop opera-tional procedures and technologies

2013-25

Definition phase
- Create European ATM Master Plan

2009-16

2005-08

SWIM Pioneers

B2B Services (Airspace Mgt., Aeronautical Info, Flight Plan Mgt.)

1.5 million messages/day

15
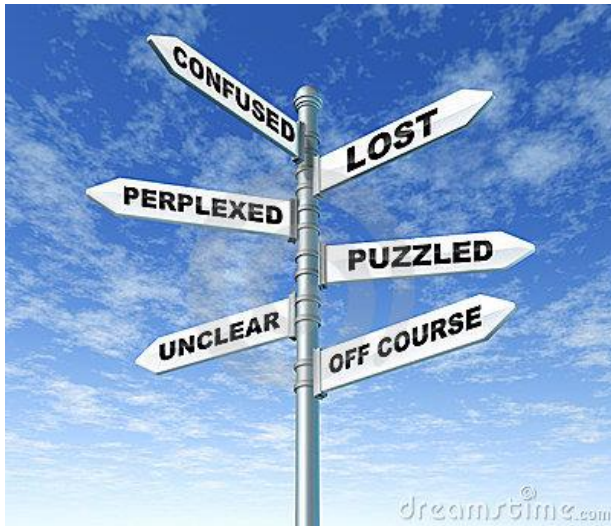
What can you do next?

- Data in digital format (e.g. AIXM)
- Available using web service technologies (XML,SOAP,WSDL)
- Over IP network (Internet/Private)
- Publish guidance to service consumers (if you build it, they will come)
- Formalize relationship with service consumers (SLAs)

Follow up information

- **SESAR Joint Undertaking**
  www.sesarju.eu/swim

- **SESAR SWIM Registry**
  http://eur-registry.swim.aero/

- **Some additional info**
  http://www.eurocontrol.int/swim

- **Email**
  swim@eurocontrol.int

See you soon

SWIM JumpStart

- ATM Viewer
- AIM, Flight, MET, Surveillance
- AIXM, FIXM, iWXXM,…
- Open Source
- Available

SESAR SWIM Registry

- 70+ Implemented Services
- Implementation Guidance Documentation