

On Digital Economy Issues Looking From the Information Systems Viewpoint

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The national program "Digital Economy of the Russian Federation" (2017)

The goals and objectives for the period up to 2025:

- (1) State regulation;
- (2) **Information infrastructure;**
- (3) Research and development;
- (4) Personnel and education;
- (5) Information security;
- (6) Public administration;
- (7) Smart city;
- (8) Digital health care.

The goal

We will focus on issues that fall within the competence of the Faculty of Computational Mathematics and Cybernetics of Lomonosov Moscow State University, more precisely, on **software development and mathematical modeling**.

These issues relate to the all mentioned above eight areas of the digital economy, but especially the "**Information Infrastructure**" section.

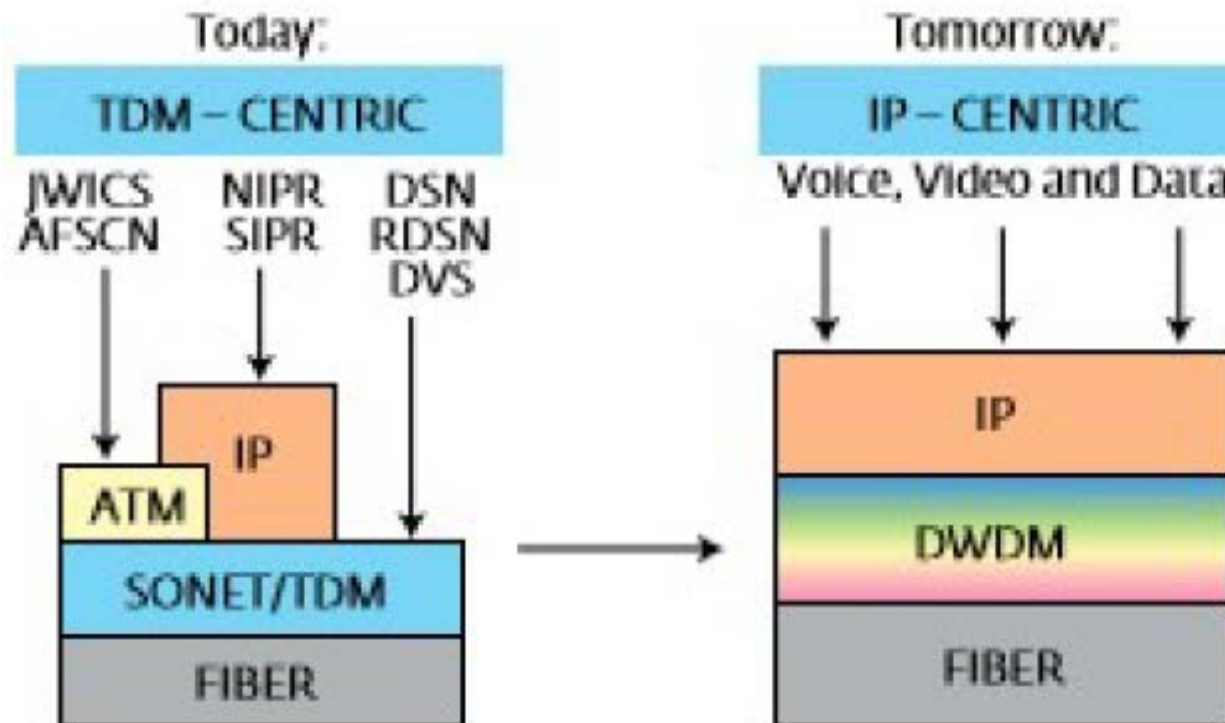
The connectivity (and **telecom**, in general) is a critical issue for the infrastructure.

We apply to the U.S. experience as a worthy case

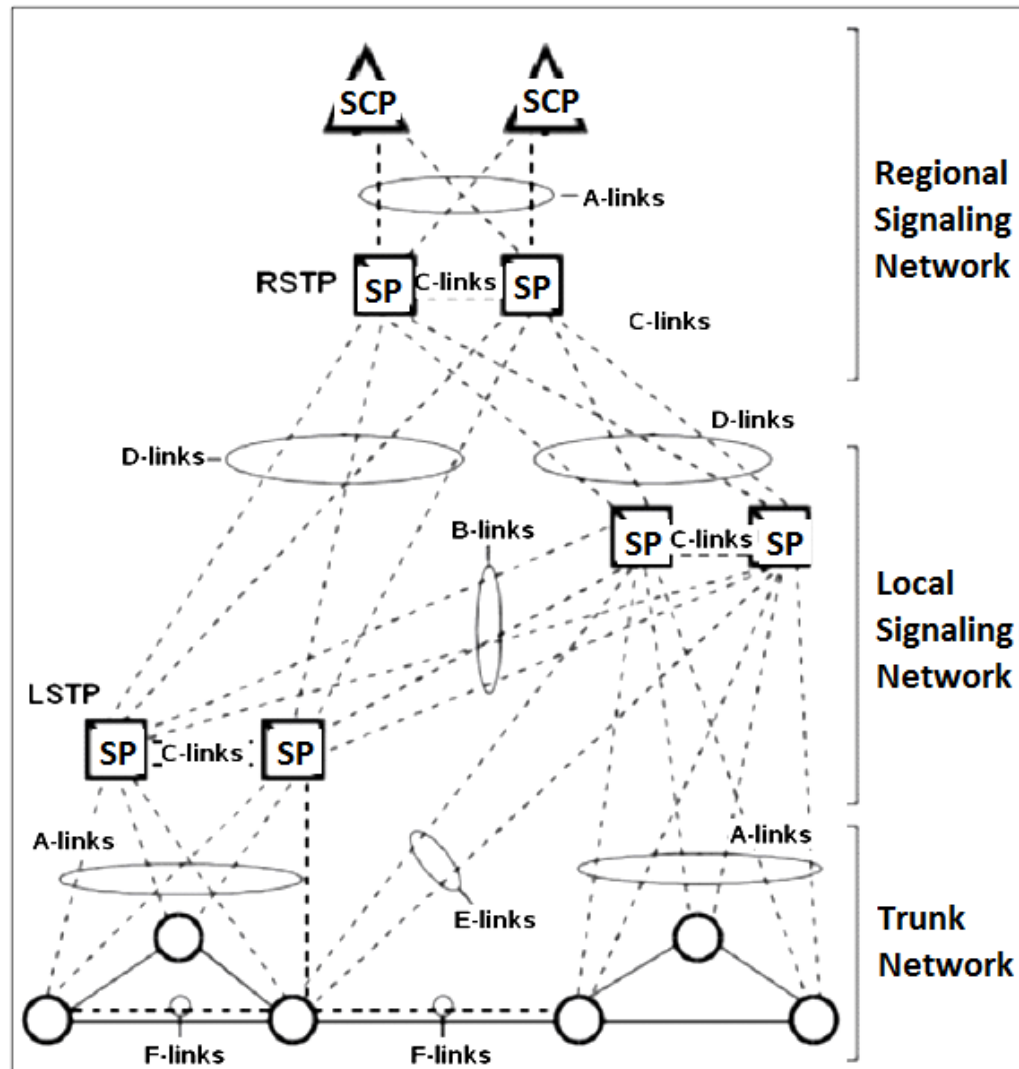
What about

1. The move from circuit switching to packet switching
2. DISN - the largest information systems in the US.
3. Information network interfaces (control points) in the US Army Common Operating Environment.
4. Federal Enterprise Architecture, namely, e-Government.
5. Lifecycle Modeling Language (LML) as an open-standard modeling language designed for systems engineering.

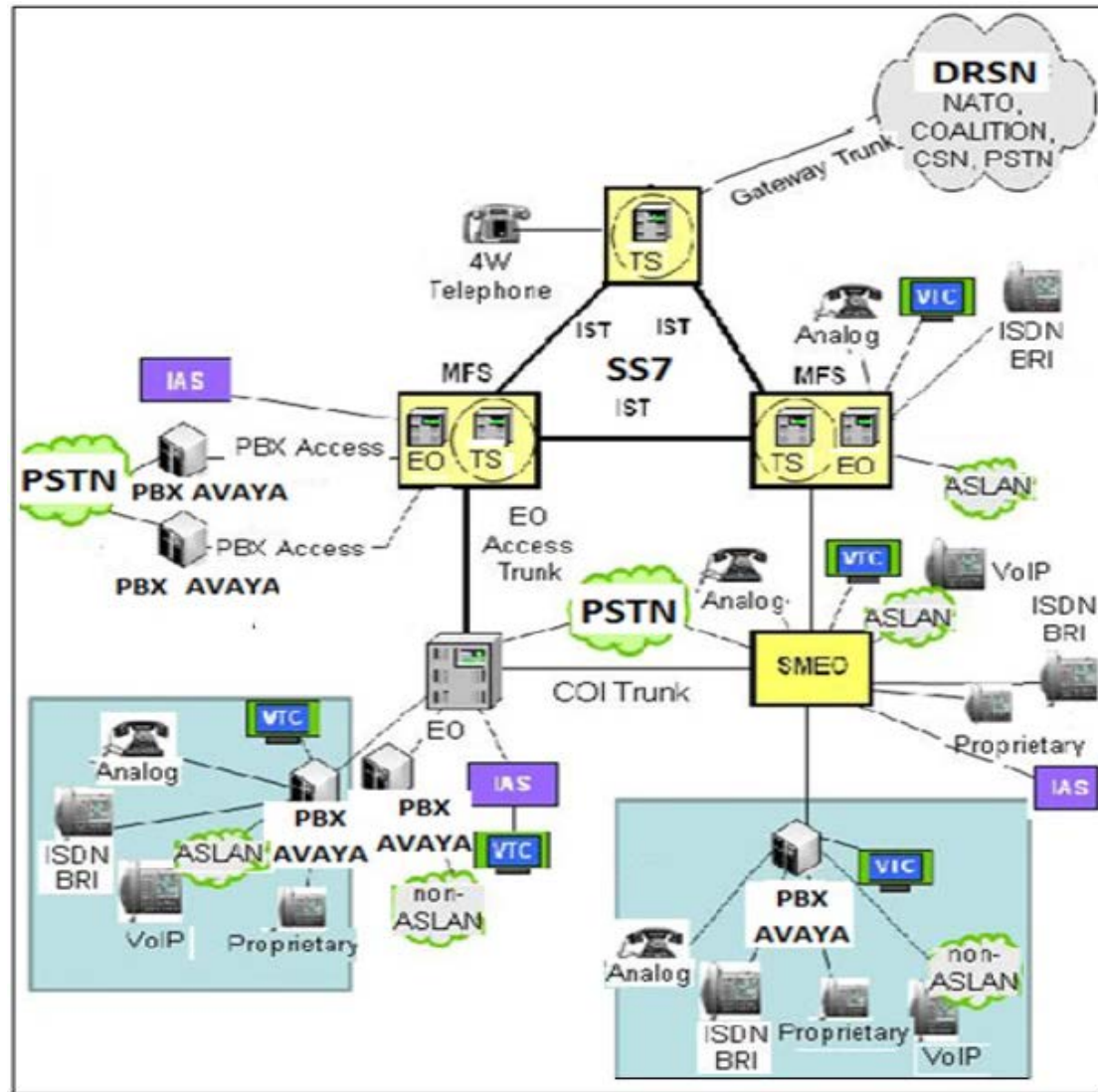
1. DISN challenge: how to move from TDM network to an IP network



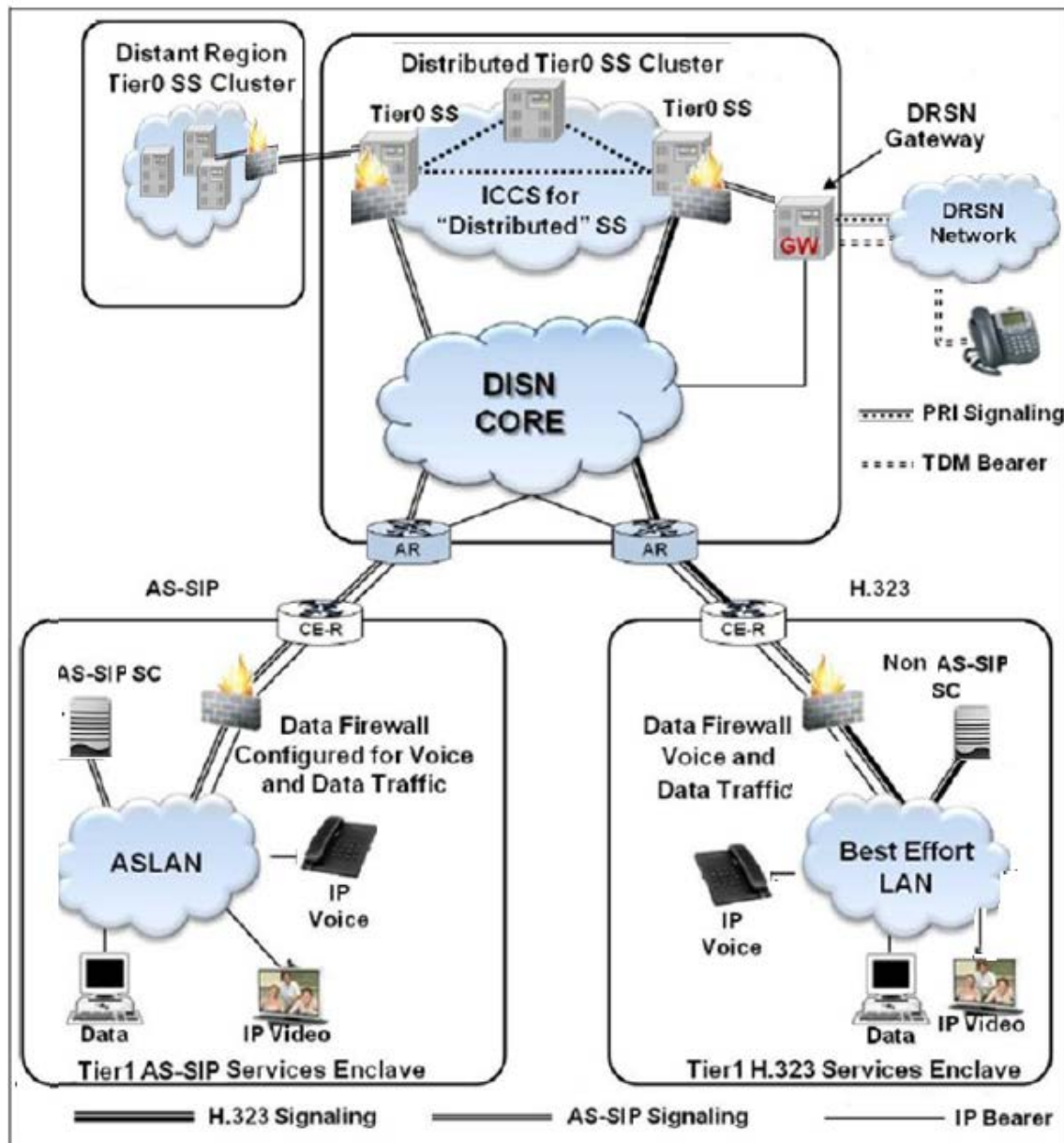
2.1. Signalling System #7 (Bell Labs, 1981)



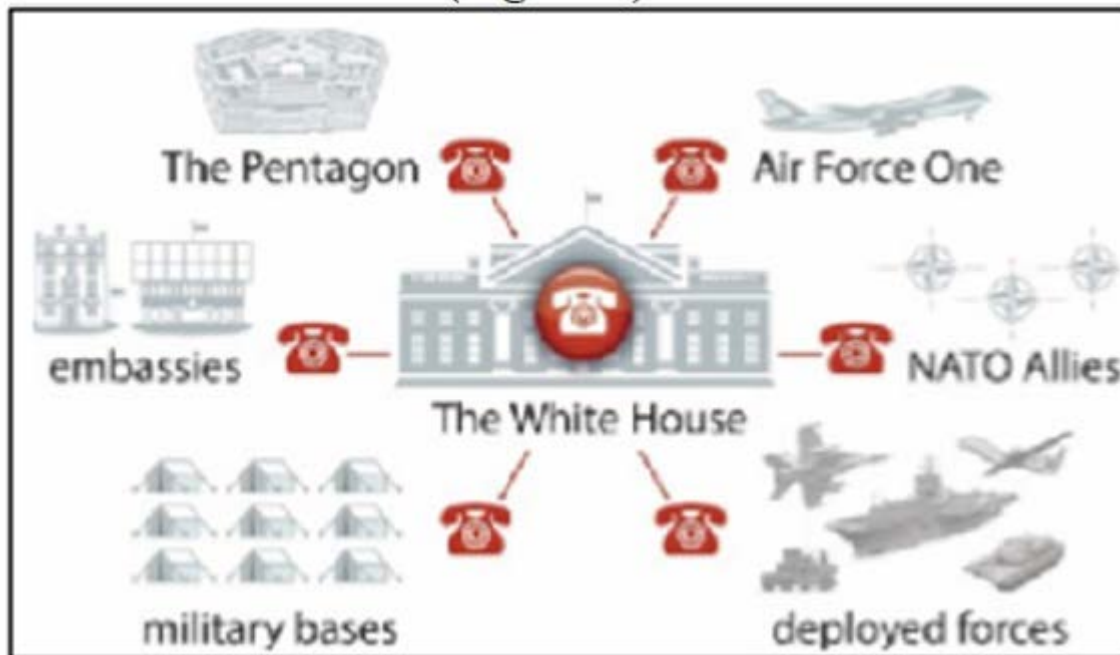
2.2. Defense Information System Network (DISN) 2011



2.3. The target architecture of DISN

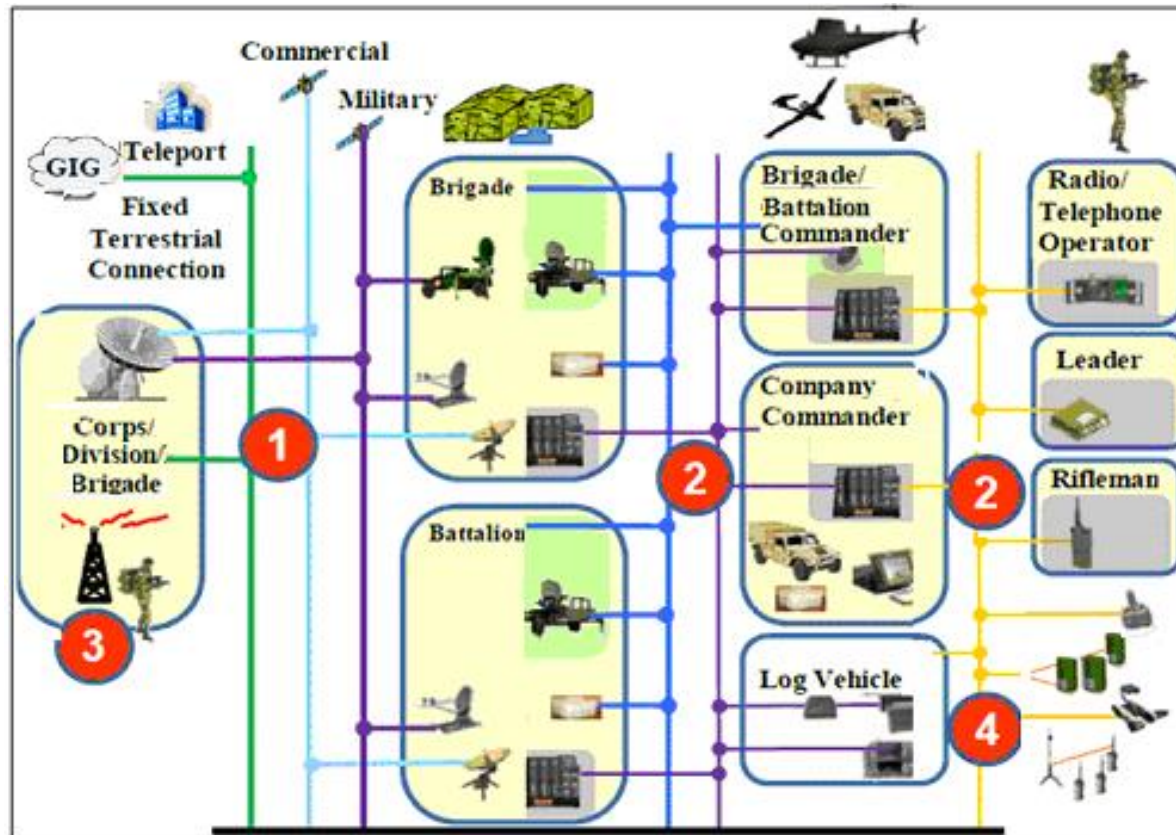


2.4. Governmental network DRSN



"Red" phone

3.1. Tactical Network and Control Points



3.2. Control Point 2 (Enterprise/Command Post to Platform/Soldier/Sensor)

Interoperability: authentication via PKI, LDAP or Active Directory;
the messaging – VMF;

geospatial data standard is VMF/MIL-STD 2525C.

Security: encryption – NSA/NIST-certified solutions; key management
– EKMS/KMI-compliant solutions;

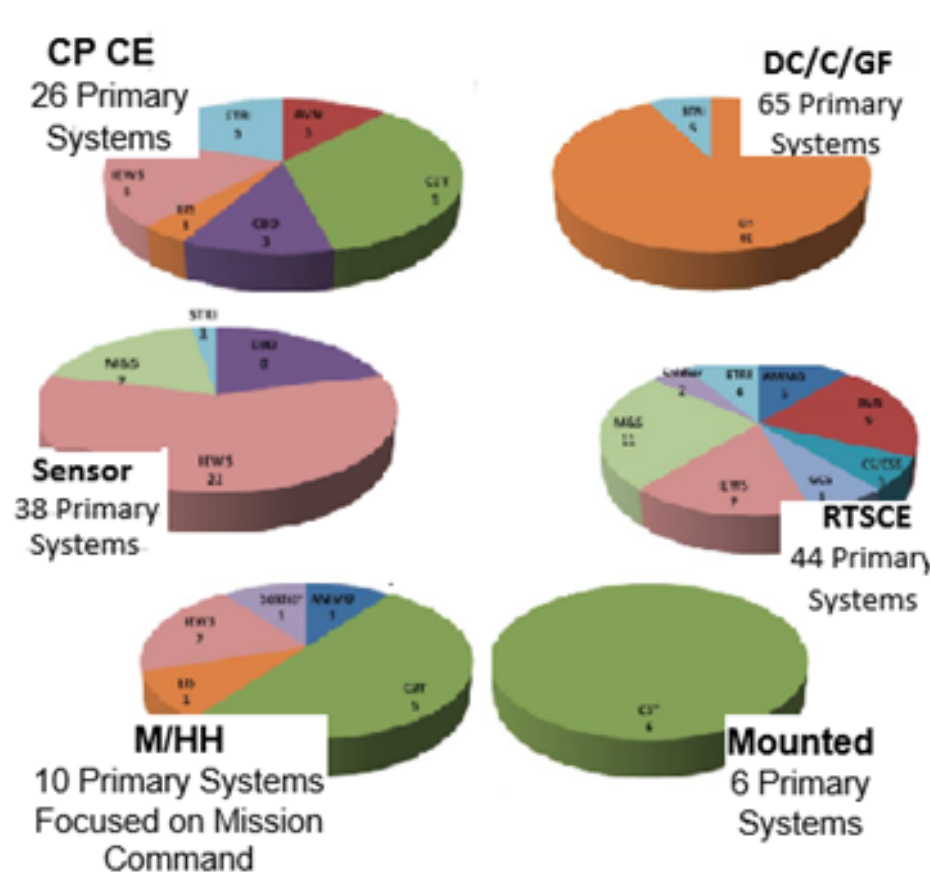
end-point protection – Host-Based Security System (HBSS);

enterprise service management – Remedy/ITSM, IP
Management/SPECTRUM;

patch management – manual.

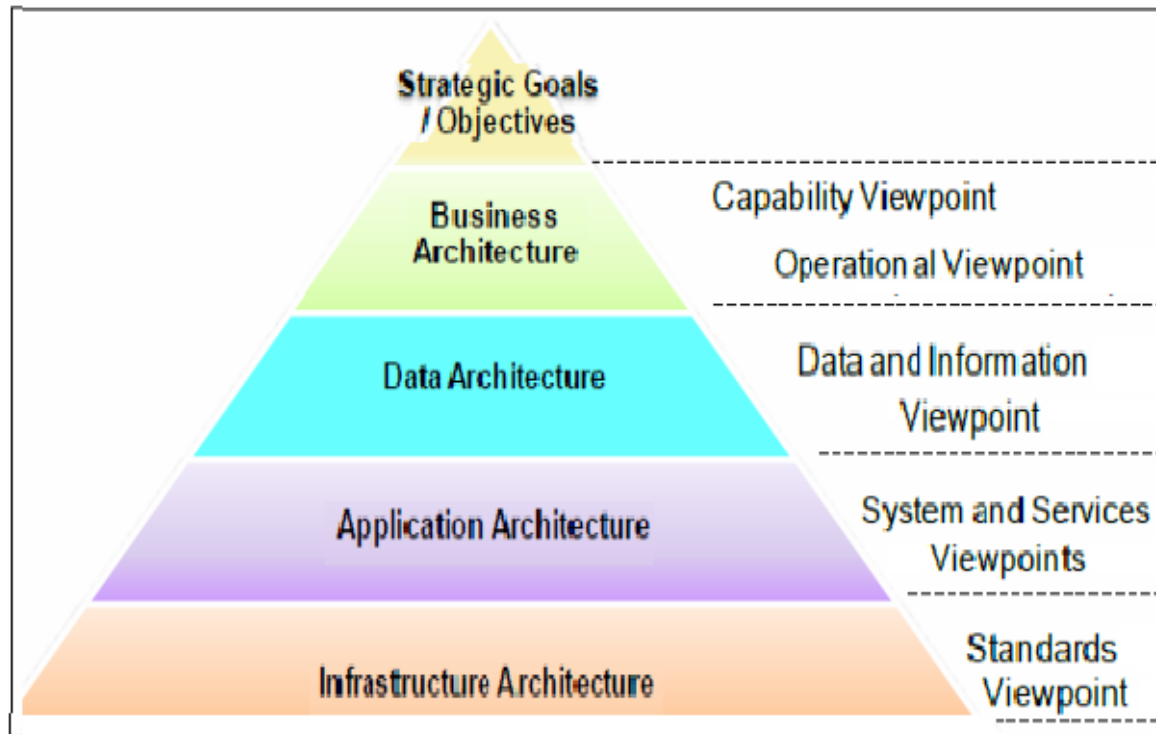
Gateways: the enterprise/command post server is responsible for the
translation of XML/SOAP to/from VMF.

3.3. Control points in COE



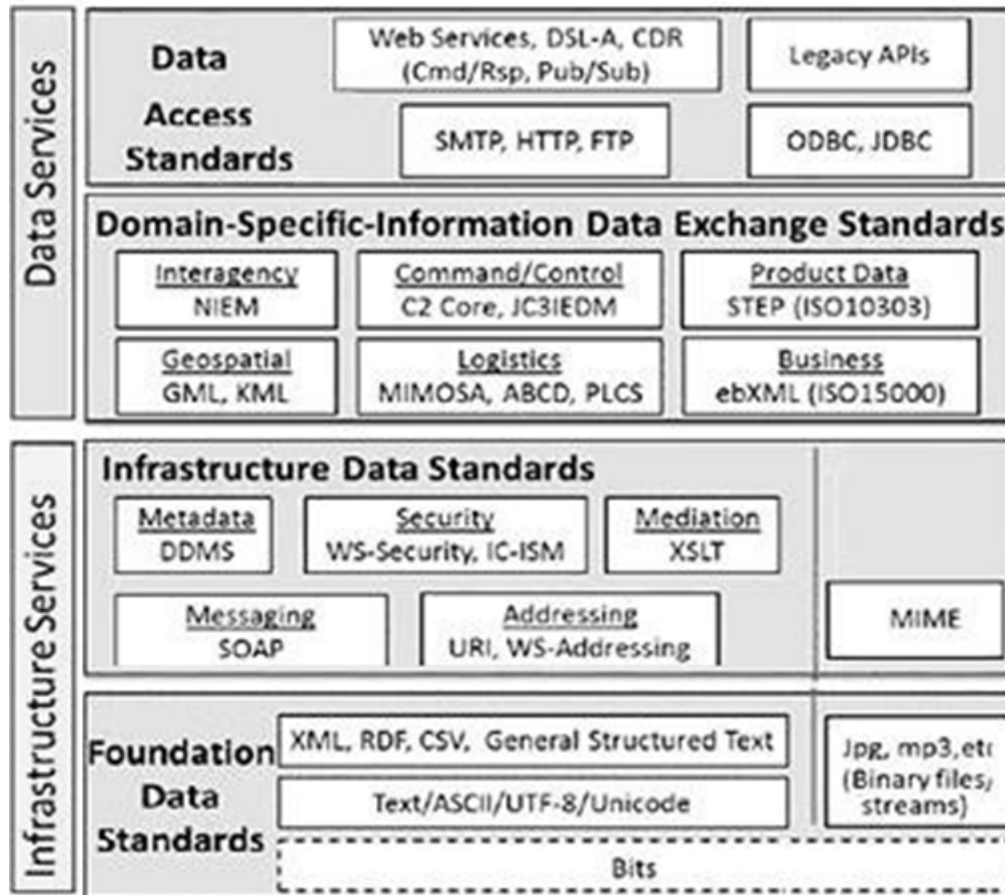
6 Computing Environments: 189 primary systems and 15 control points

3.4. Joint Information Environment (52 volumes)



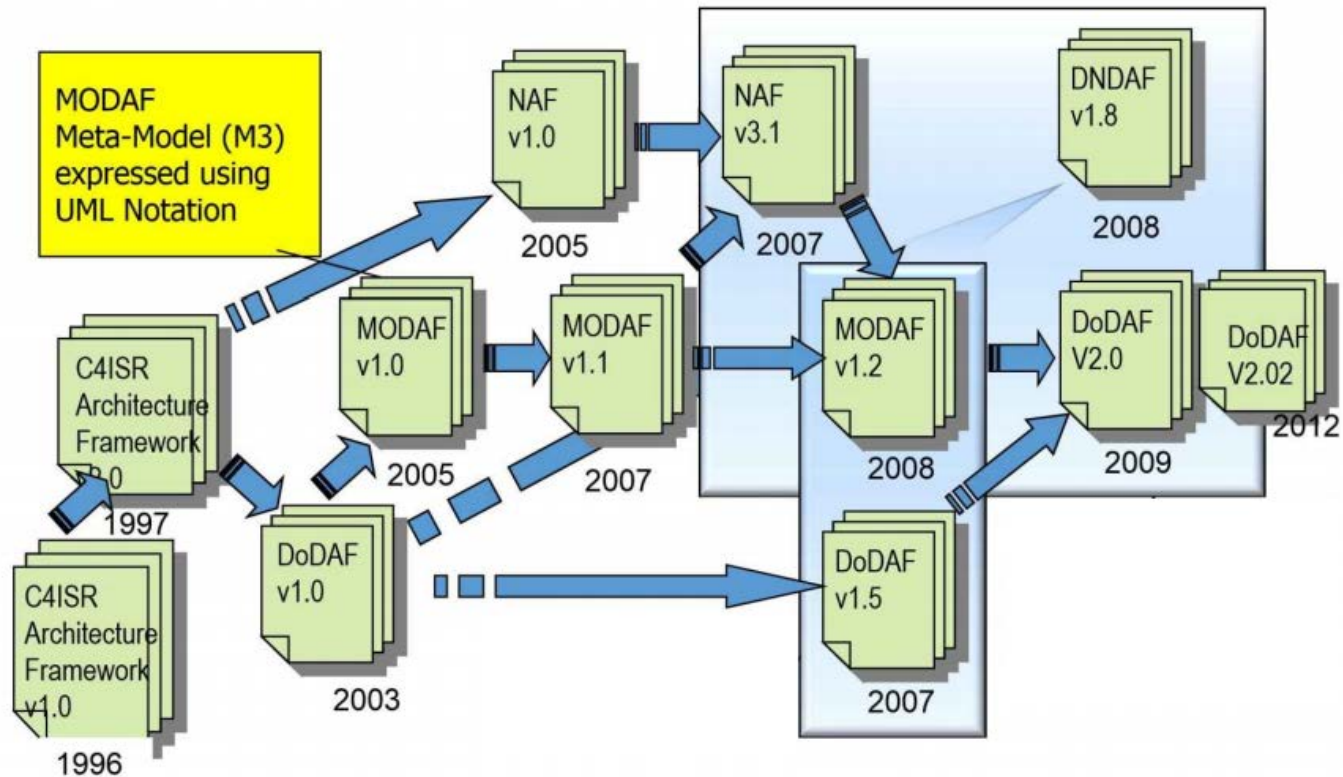
- All Viewpoint – 2 volumes,
- Capability Viewpoint – 7,
- Data and Information Viewpoint – 3,
- Operational Viewpoint – 9,
- Project Viewpoint – 3,
- Services Viewpoint – 13,
- System Viewpoint – 13,
- Standard Viewpoint – 2.

3.5. US Army Common Operating Environment

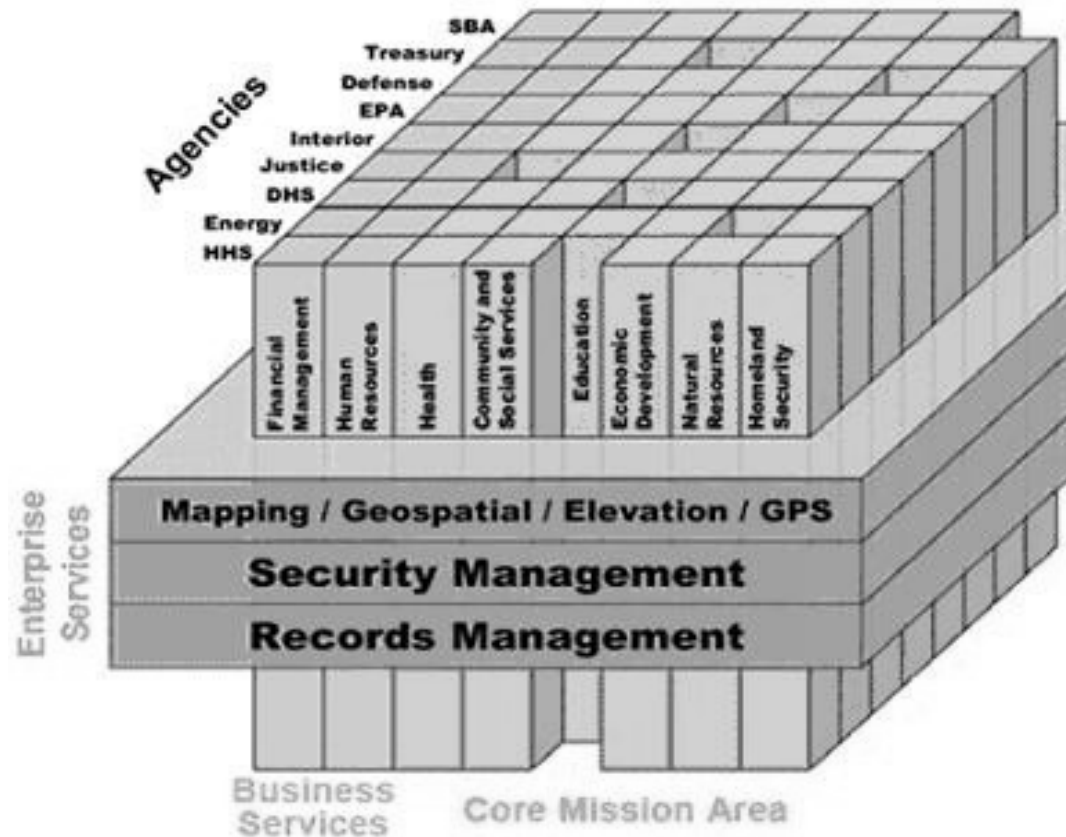


Data Standard Classifications

3.6. DoD Architecture Framework Evolution



4.1. Federal Enterprise Architecture



Based on the Zachman model (1087), the NIST has developed an e-government model for the US federal government

4.2. GAO critics

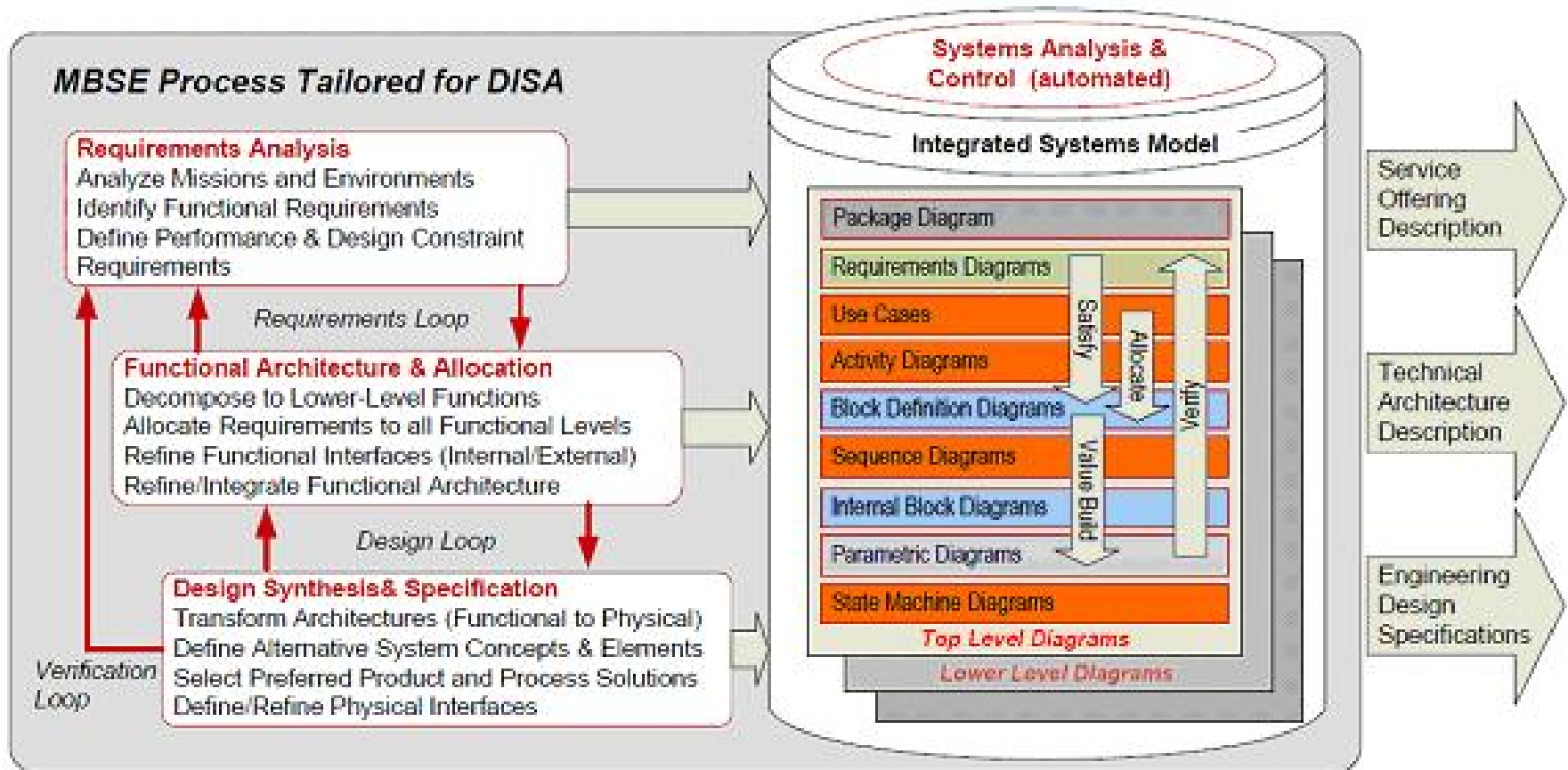
The official report of the Government Accountability Office for the US Congress on the status of the FEA program in 2002, it was concluded that "in general, the FEA system is not sufficiently developed to make informed investment decisions in the IT field"

GAO. 2002. "Information Technology: Enterprise Architecture Use Across the Federal Government Can Be Improved," GAO-02-6, Government Accountability Office, Washington, DC.

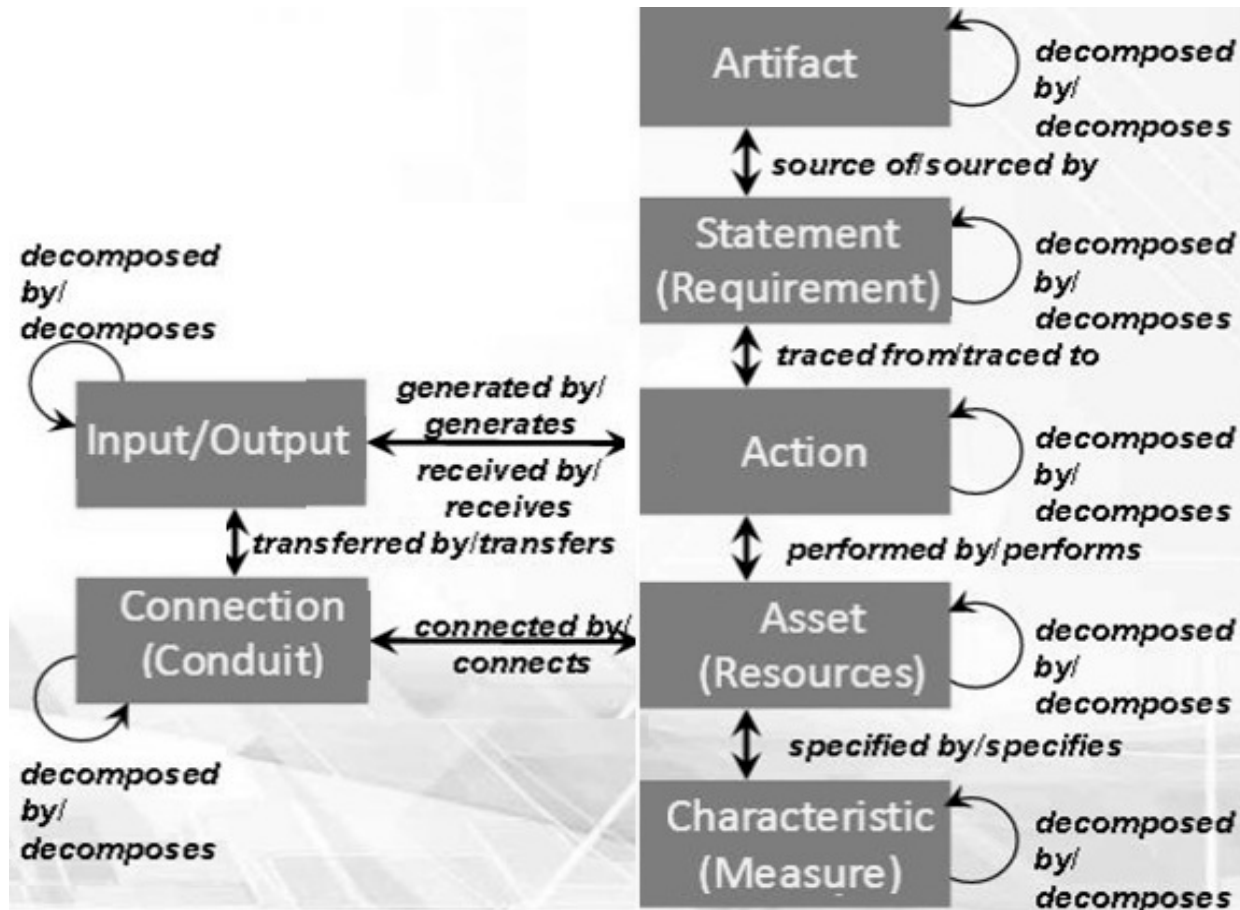
The FEA program was extremely expensive: "by the end of 2010, the federal government spent more than a billion dollars on corporate architecture, and much, if not most, of it was wasted"

S.B. Gaver (2010) "Why Doesn't the Federal Enterprise Architecture Work?" *Technology Matters*, McLean, VA.

5.1. MBSE (Model based Systems Engineering) and SysML (Systems Modeling Language)



5.2. Lifecycle Modeling Language



The goal of LML is to replace UML and SysML

6. On study courses

D.Namiot, "On Internet of Things and Smart Cities educational courses"// International Journal of Open Information Technologies vol. 4, no.5, 2016, pp. 26-38.

D.Namiot, M.Sneps-Sneppe. "On IoT Programming."// International Journal of Open Information Technologies vol. 2, no.10, 2014, pp.25-28.

D.Namiot, M.Sneps-Sneppe. "On M2M Software."// International Journal of Open Information Technologies, vol. 2, no.6, 2014, pp.29-36.

Smart Cities and Urban Analytics

<http://www.bartlett.ucl.ac.uk/casa/programmes/postgraduate/msc-smart-cities-and-urban-analytics>

Master in City Science <http://www.citysciences.com/>

EIT Digital Master School <http://www.masterschool.eitictlabs.eu/programmes/es/>

MIT IoT <http://web.mit.edu/professional/digital-programs/courses/loT/index.html>

Conclusion

Our current tasks from software development point of view:

1. To develop telecommunications infrastructure architecture
2. To select infrastructure interfaces (control points) and standards
3. To point out Joint Information Environment (Zachman's type or other)
4. To choose programming language (e.g. Lifecycle Modeling Language)

Thanks for attention!