

The curse of software: Pentagon telecommunications case



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Outlook

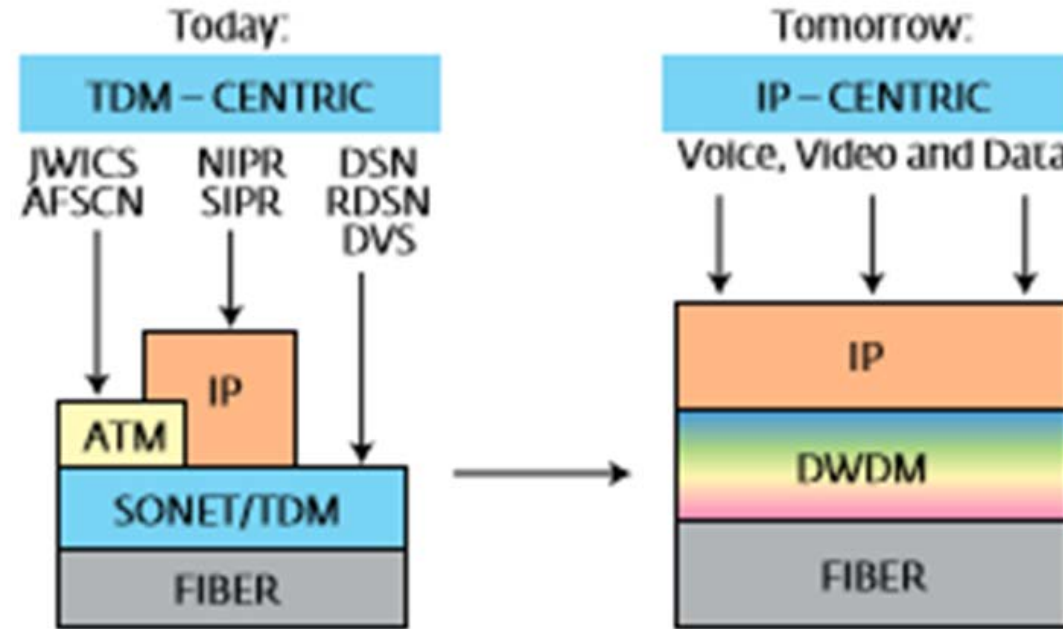
For shifting from circuit switching to packet switching in telecommunications, the main obstacle is excessive software.

Three generations of American military communications: :

- (1) implementation of signaling SS7 and Advanced Intelligent Network,
- (2) transformation from SS7 to IP protocol,
- (3) the extremely ambitious cybersecurity issues.

We discuss the newer US Government Accountability Office (2018) report on military equipment cyber vulnerabilities.

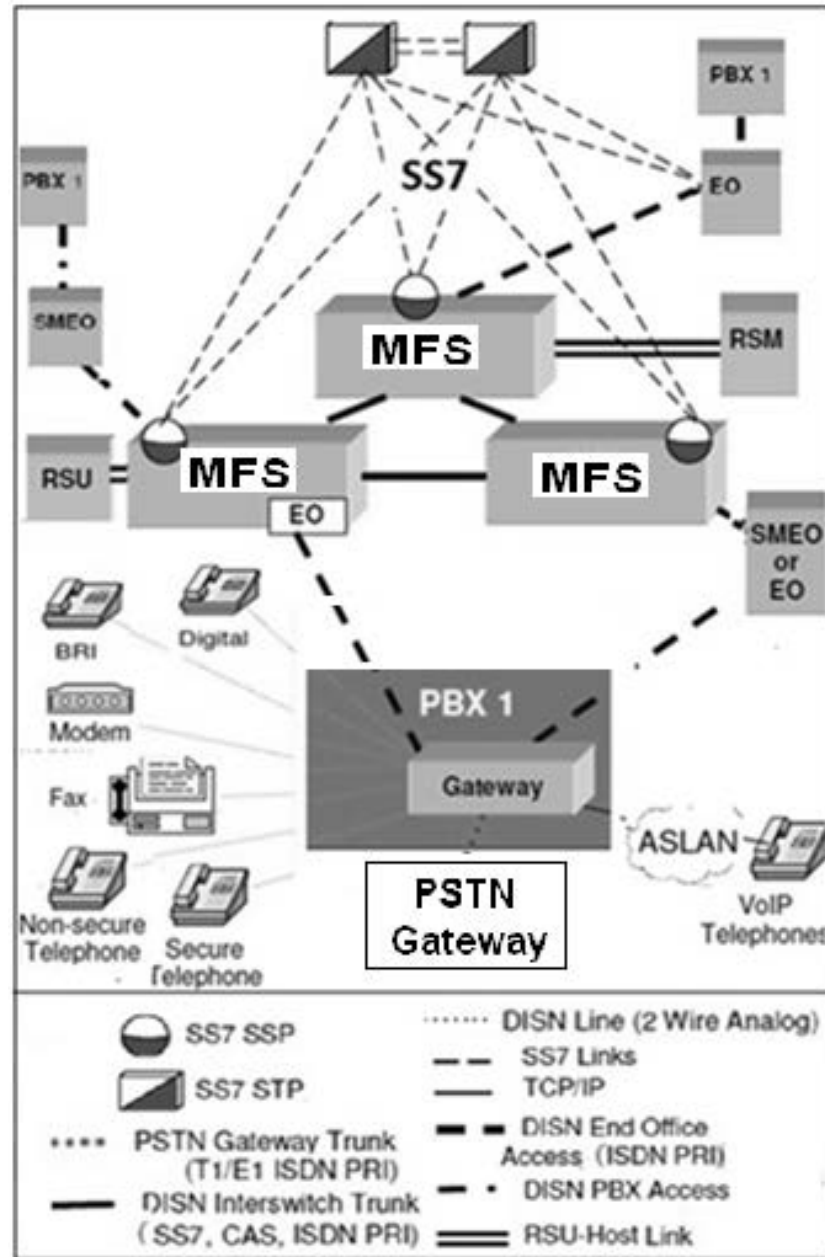
DISN challenge: from SS7 to IP



DSN (Defense Switched Network),
DRSN (Defense Red Switched Network),
DVS (DISN VIDEO).

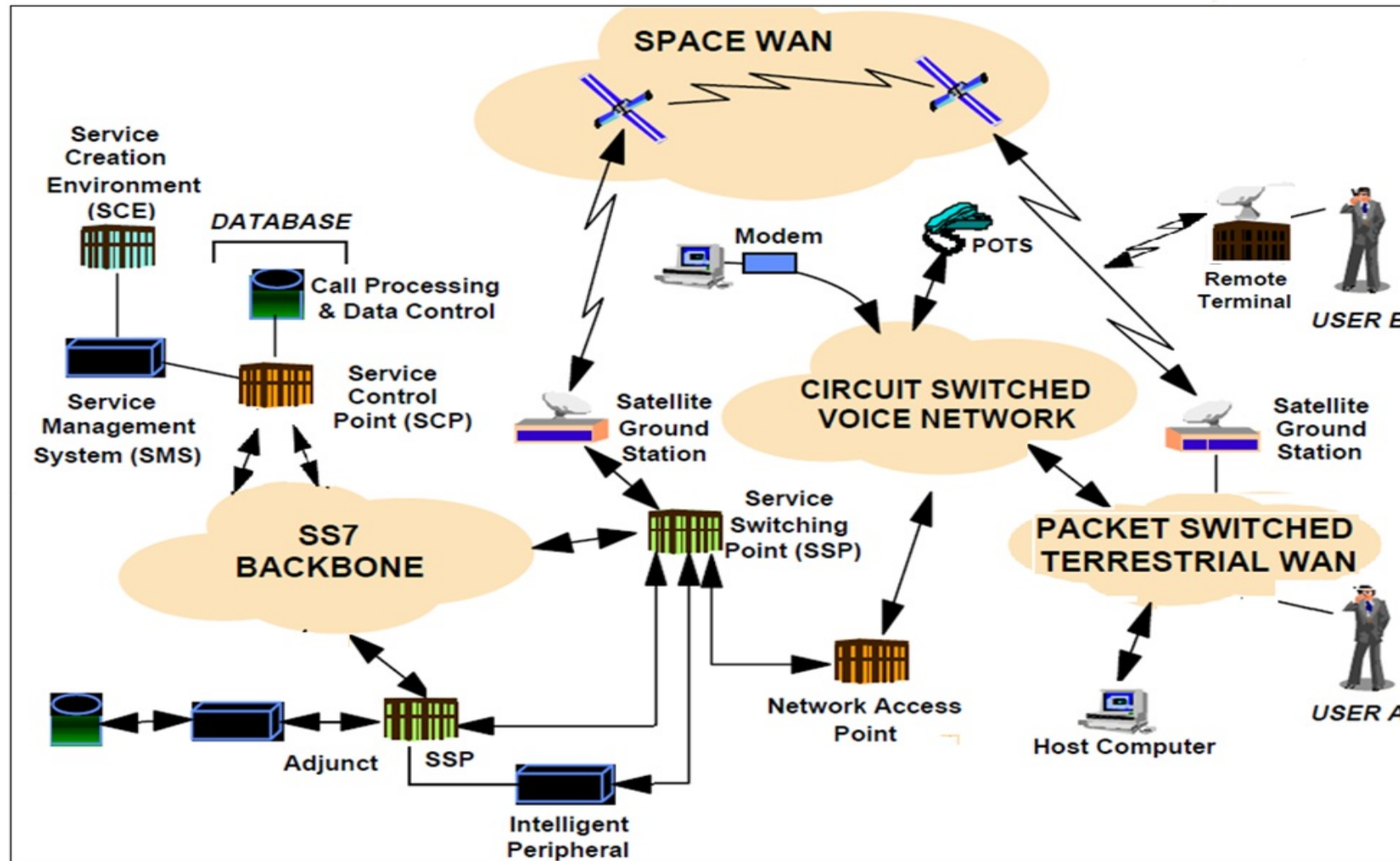
JWICS (Joint Worldwide Intelligence Communications System)
AFSCN (Air Force Satellite Control Network),
NIPRNet (Non-classified Internet Protocol Router Network)
SIPRNet (Secret Internet Protocol Router Network)

DISN JOINT VISION 2010: SS7 & AIN



The simplified DISN view

Advanced Intelligent Network (AIN) Service Architecture



Shortcoming No1

From the very beginning of Joint Vision 2010 program, Lockheed Martin was responsible for the AIN.

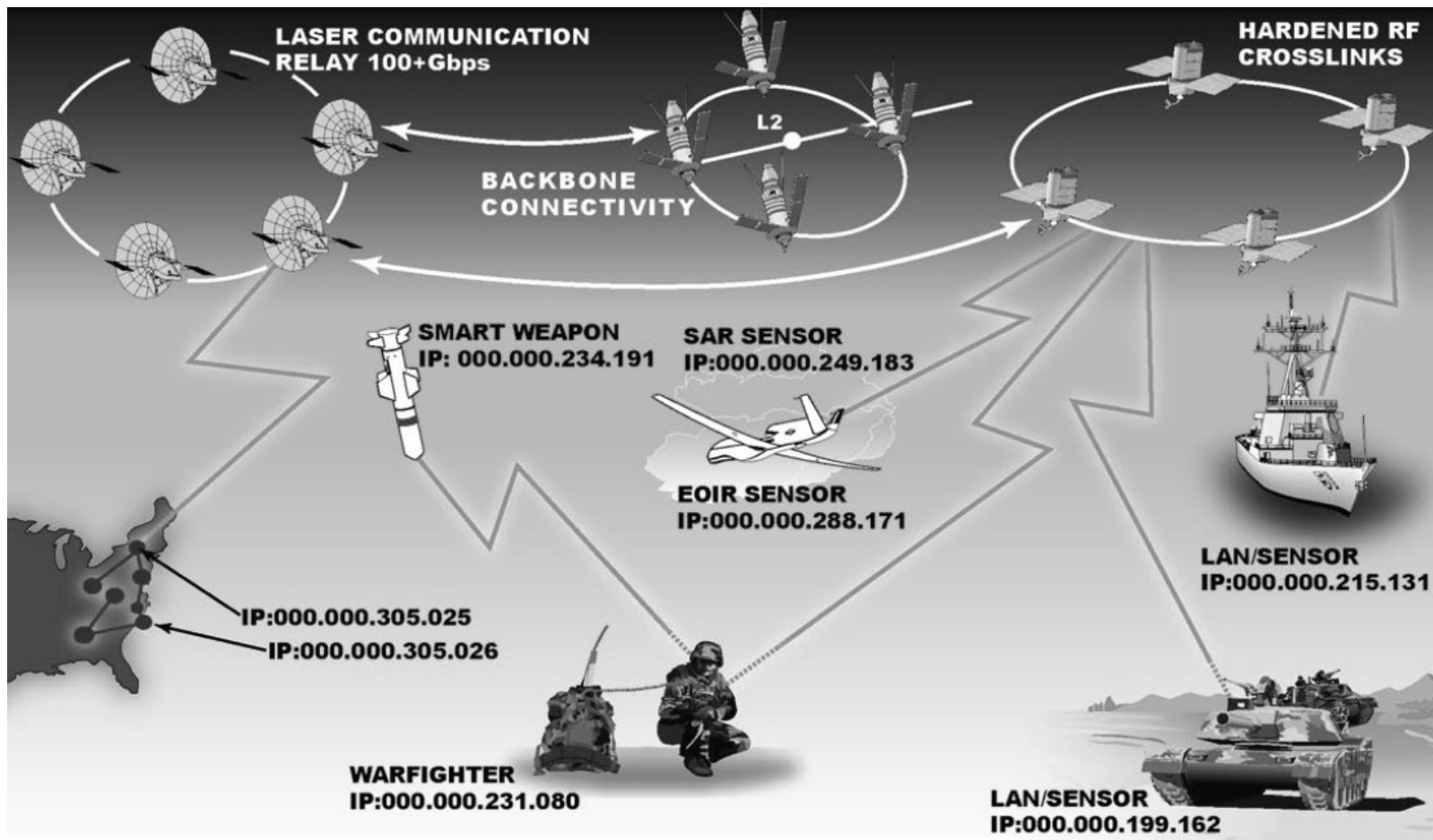
The emergence of new military equipment and new services requires the improvement of AIN.

In the long list of vacancies, the first place took the search for analysts of multifunctional information systems.

From the applicants were required skills on AIN and equipment from CISCO, Juniper, etc.

Veterans with 28 years experience were invited also.

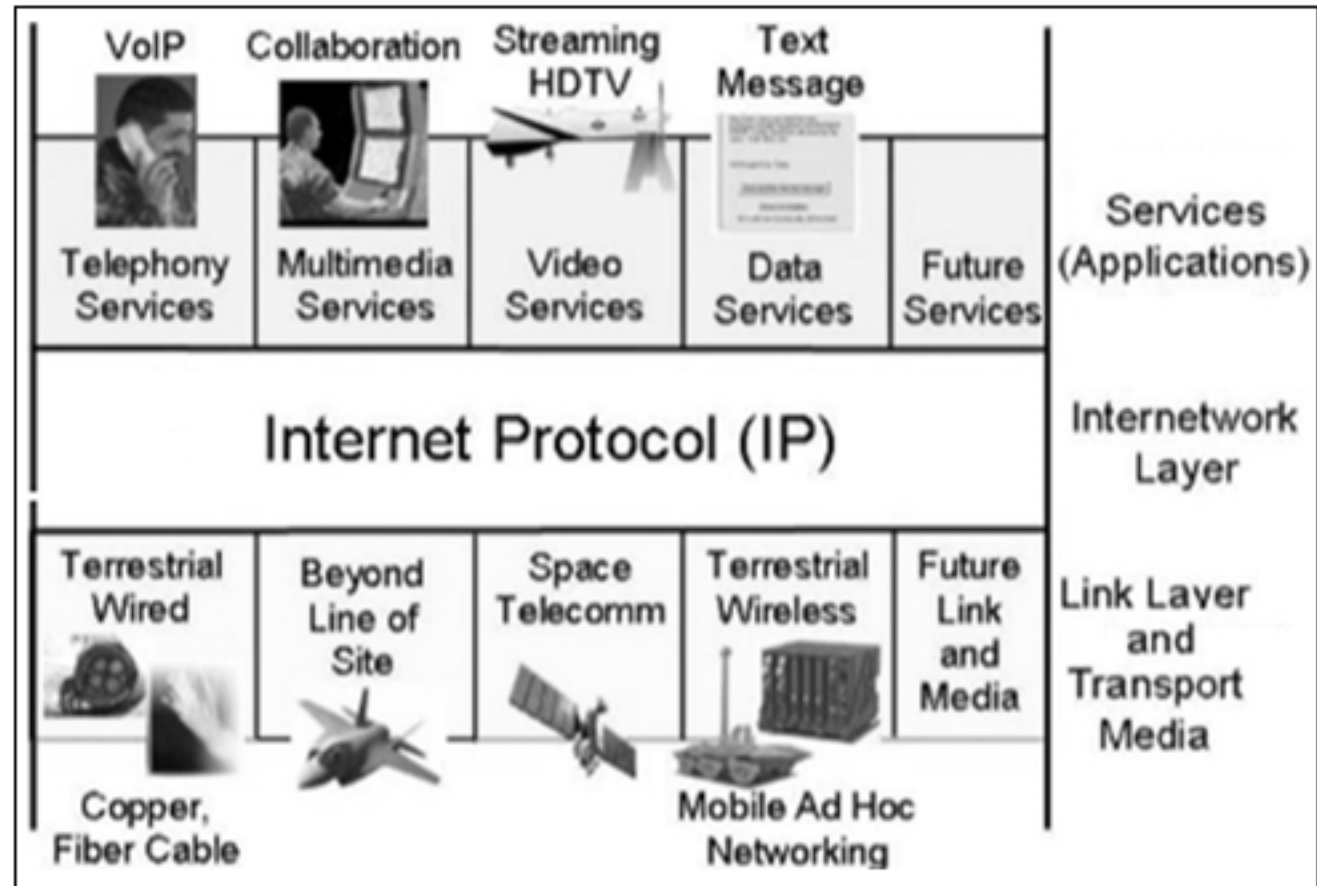
Joint Vision-2020



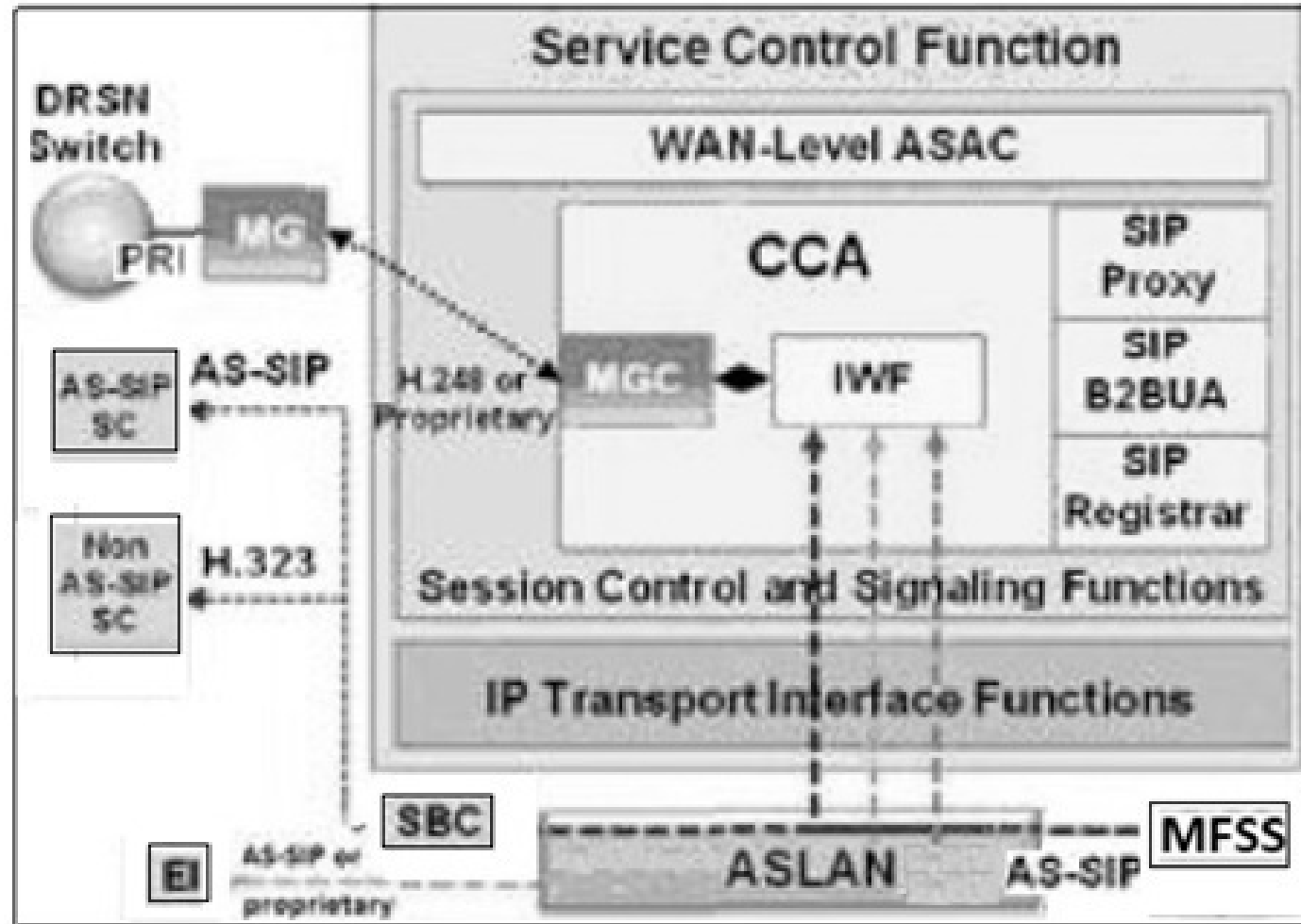
Communications Infrastructure (each warfare object has own IP address)

Global Information Grid

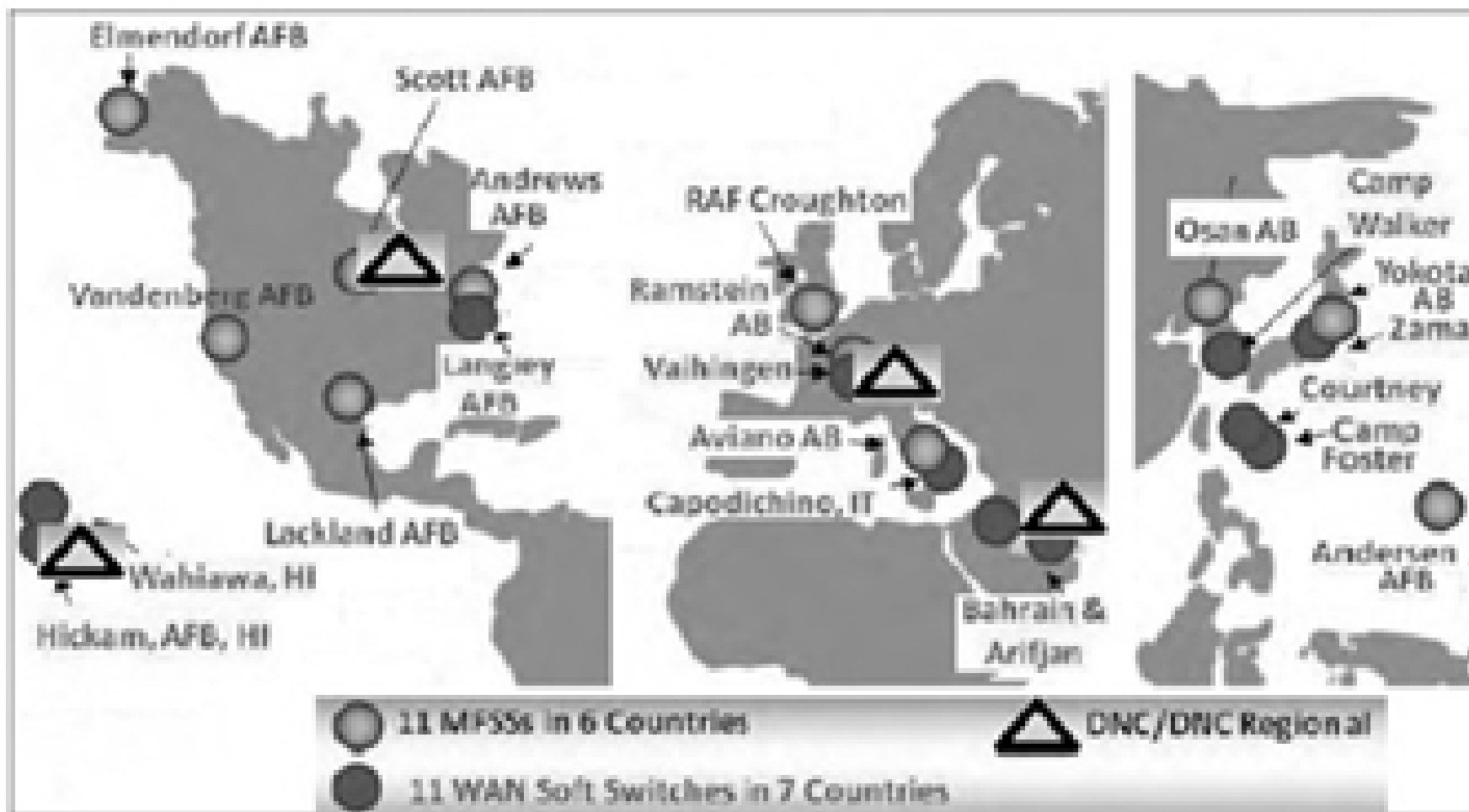
Internetworking Convergence Layer



Reference model for Multifunction SoftSwitch (MFSS)



CISCO has installed 22 major softswitches



Shortcoming No2

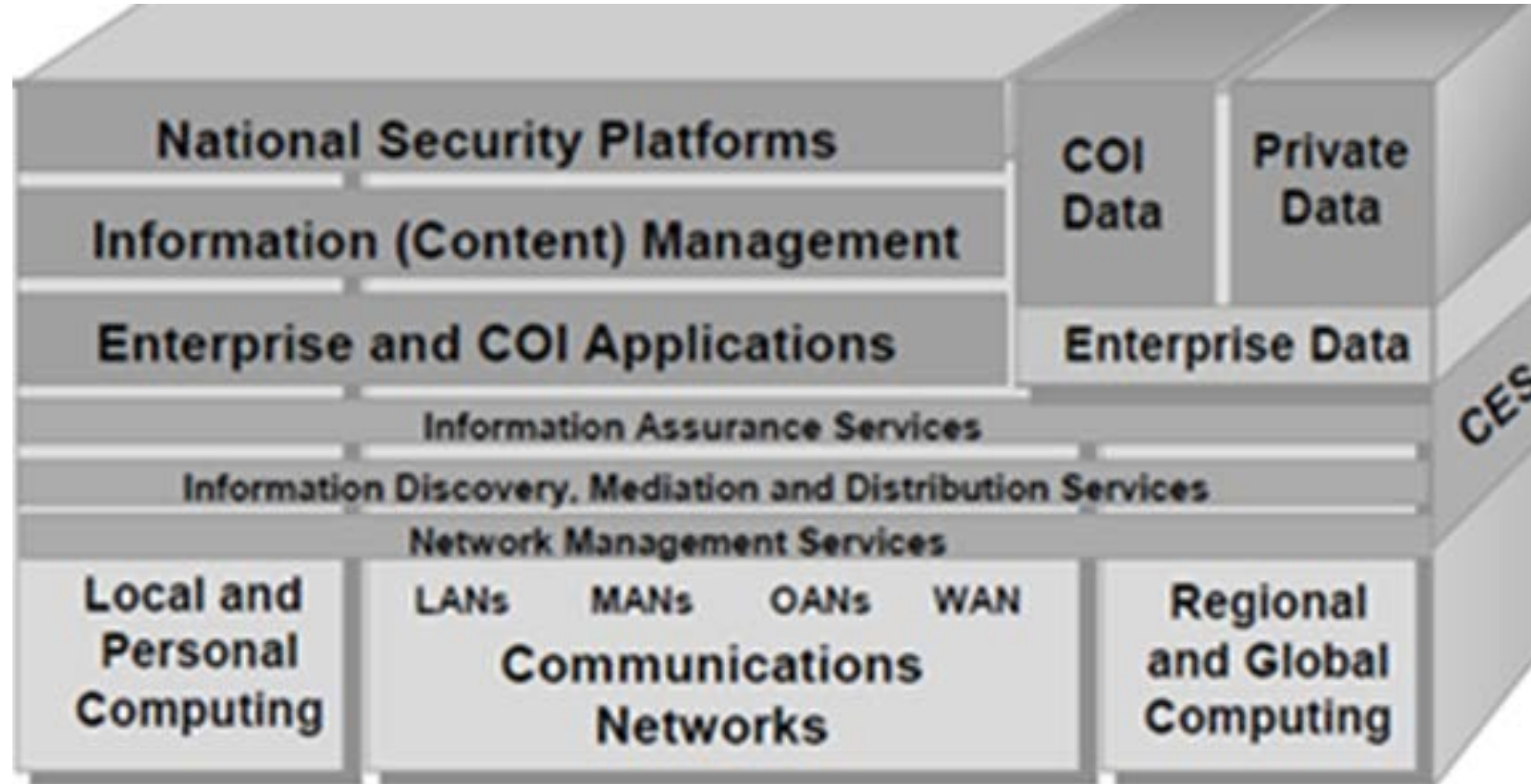
In June 2012, Lockheed Martin won the largest tender for managing the DISN network (Global Services Management-Operations, GSM-O) - USD 4.6 billion for 7 years.

In 2013, the GSM-O team began to study the status of the four GIG network management centers. It was decided to consolidate the operating centers - from four to two: the centers in Bahrain and Germany are being closed.

In 2015, Lockheed Martin sells its division “LM Information and Global Solutions” to the competing firm Leidos.

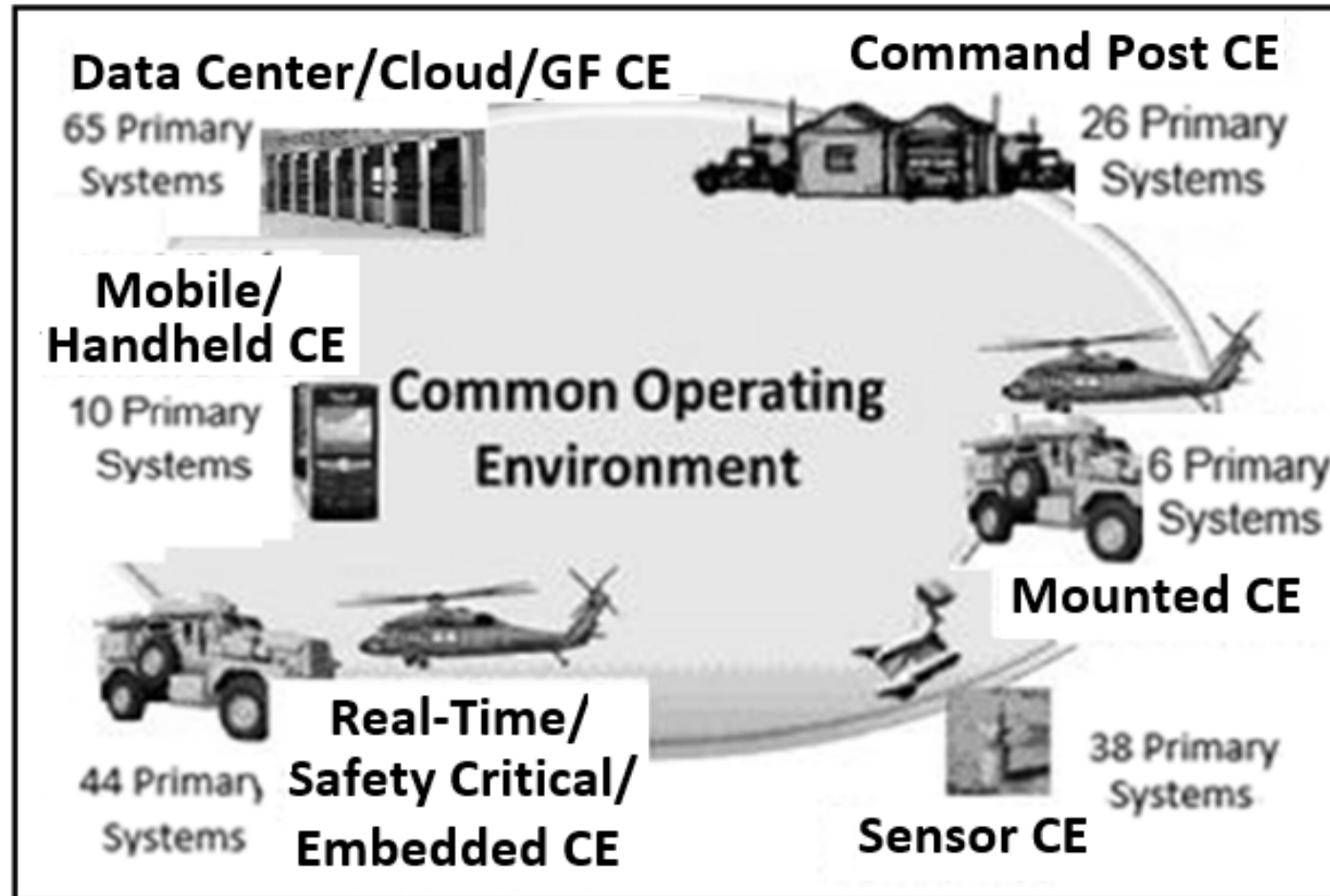
The inability to recruit developers capable of combining the "old" circuit switching equipment with the latest packet switching systems as well as taking into account the new **cybersecurity** requirements.

JOINT INFORMATION ENVIRONMENT: A BEAUTIFUL BUT UNATTAINABLE DREAM



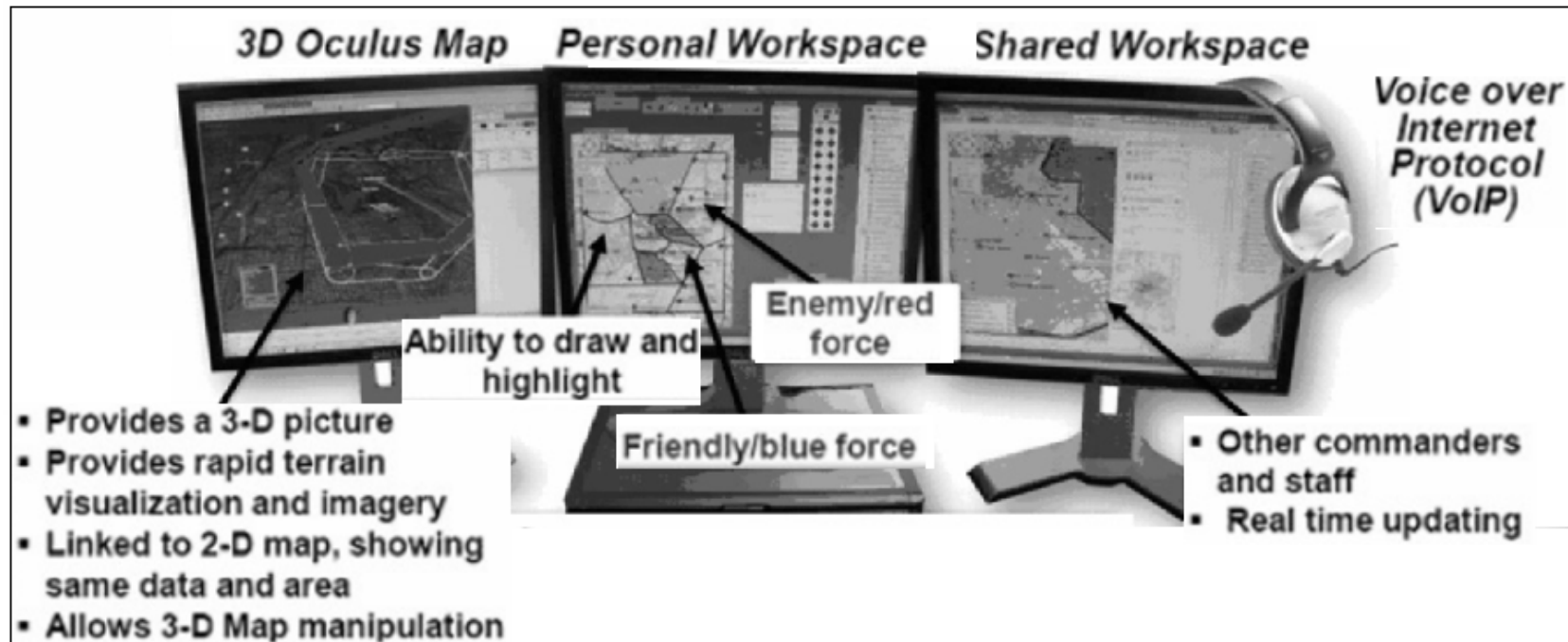
The target architecture of the JIE

ON MILITARY SOFTWARE COMPLEXITY

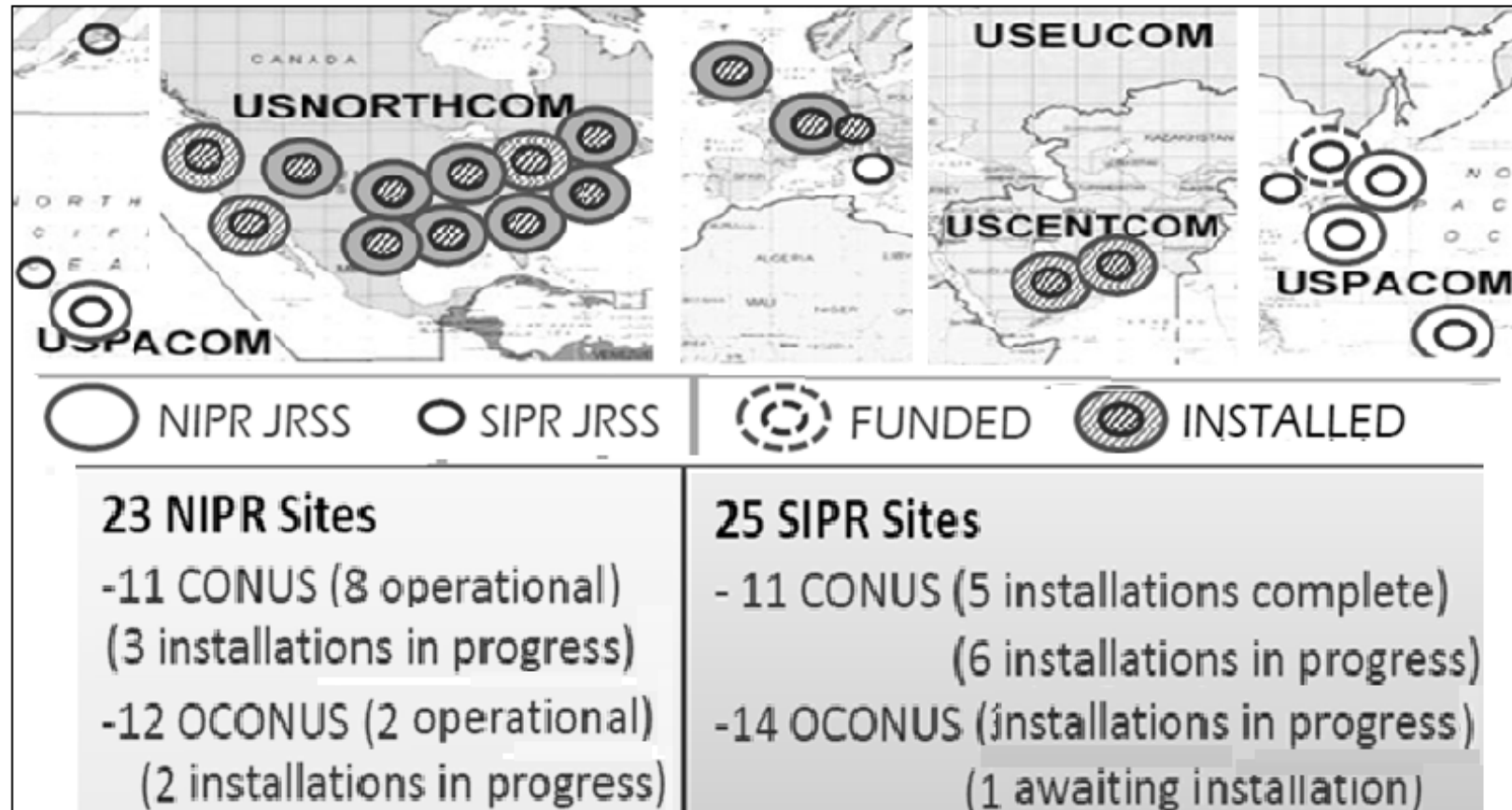


COE focuses on six CE containing 189 US Army primary military systems

Command Post of the future



JOINT REGIONAL SECURITY STACKS: A TOTAL FAILURE



Shortcoming No3

July 2016. A report GAO-16-593 [34] required more control over spending of funds for the creation of the Joint Information Environment.

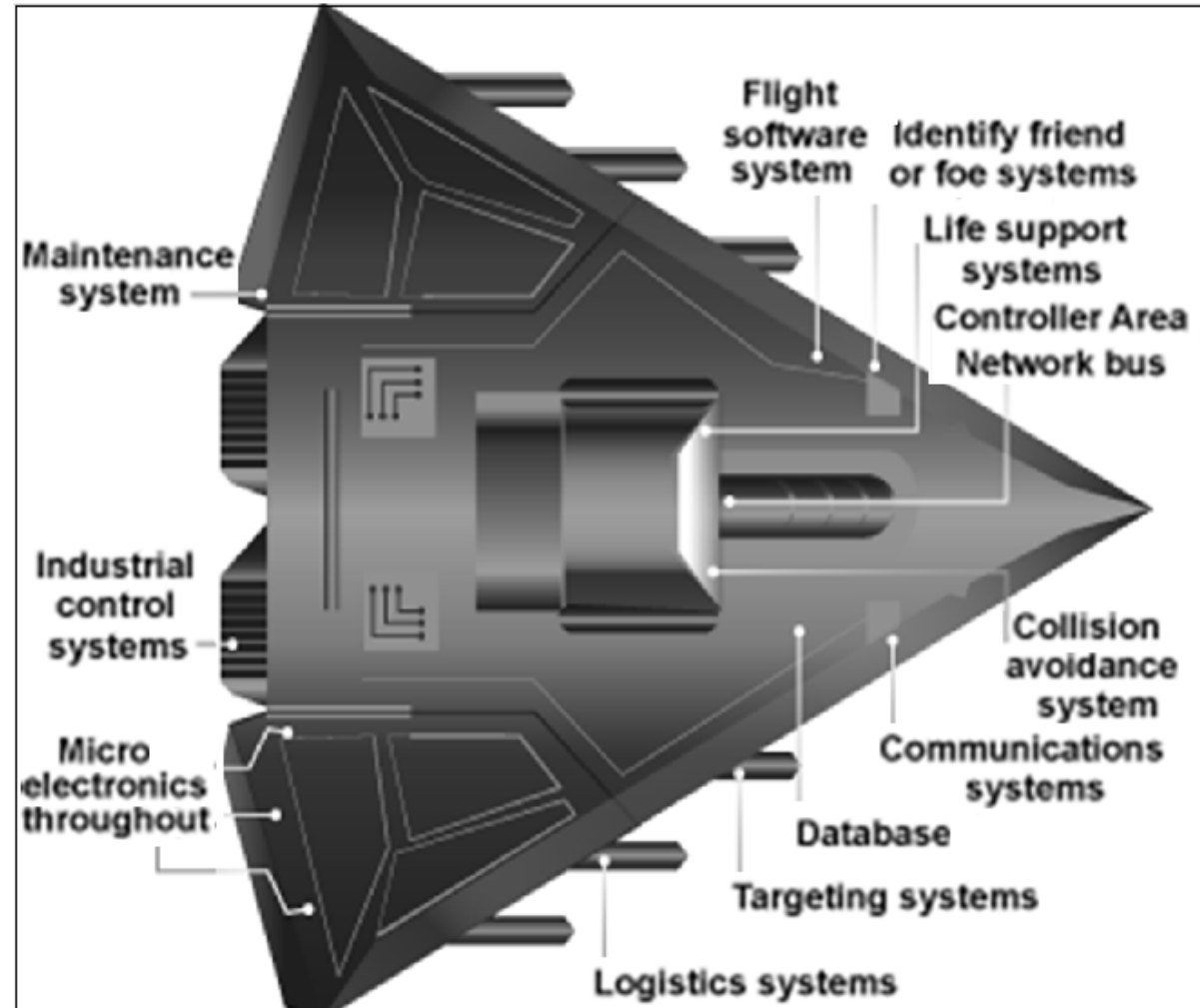
January 2018. Under the pressure of GAO critics, the Pentagon's chief weapons tester said the DoD should stop deploying its new network security platform JRSS.

Potential JRSS developers (for Leidos) - work experience of 12-14 years and knowledge of at least two or more products from ArcSight, TippingPoint, Sourcefire, Argus, Bro, Fidelis XPS, Niksun FPCAP, Lancop, NetCool, InfoVista, and Riverbed.

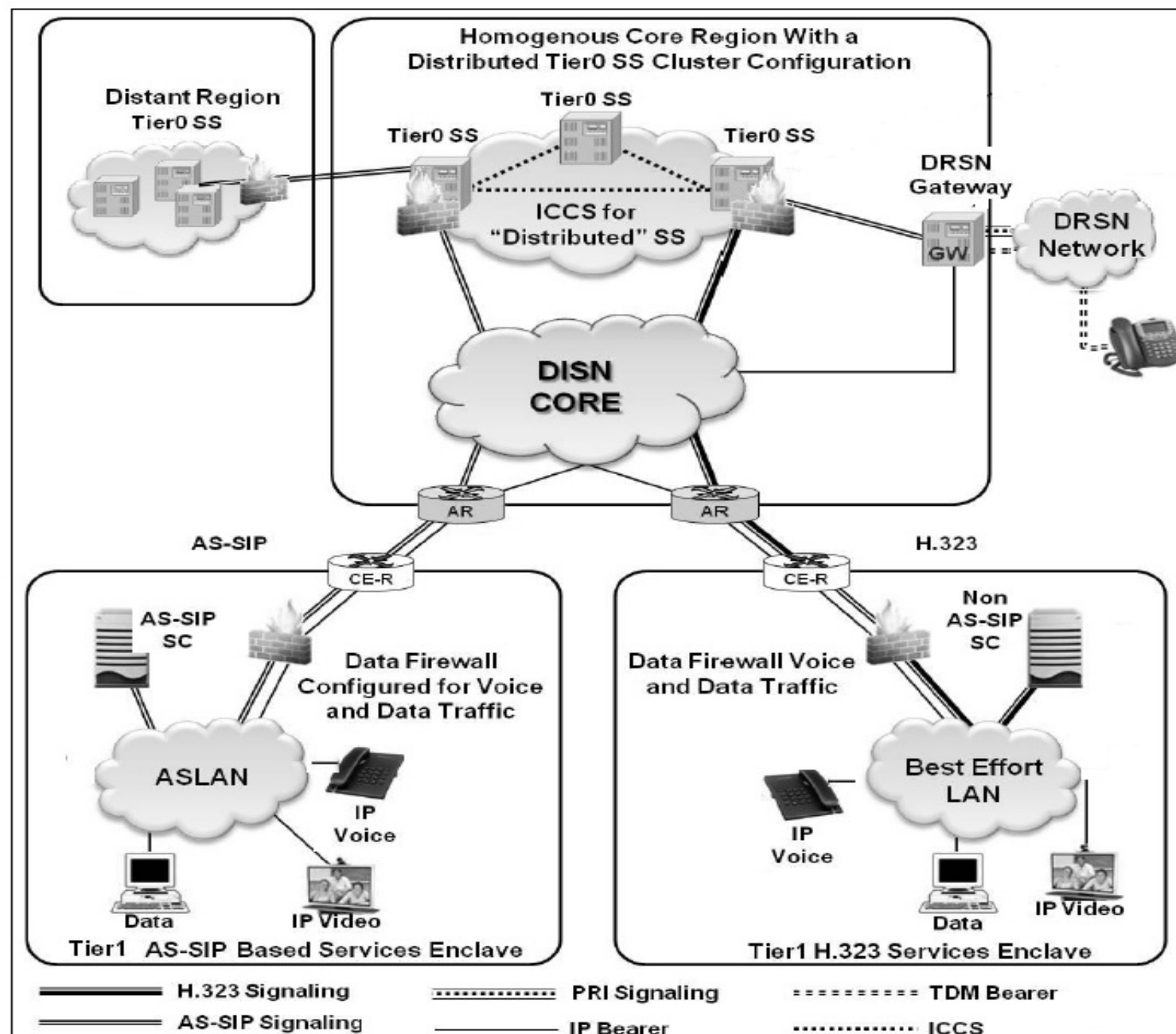
The crucial JRSS failure is extremely important: **JRSS is too S-L-O-W.**

GAO REPORT OF OCTOBER 2018 AS A PENTAGON SENTENCE

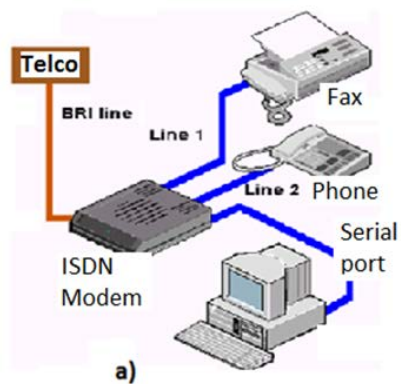
GAO report:
the United States
weapons systems
developed between 2012
and 2017 have severe,
even “mission critical”
cyber vulnerabilities.



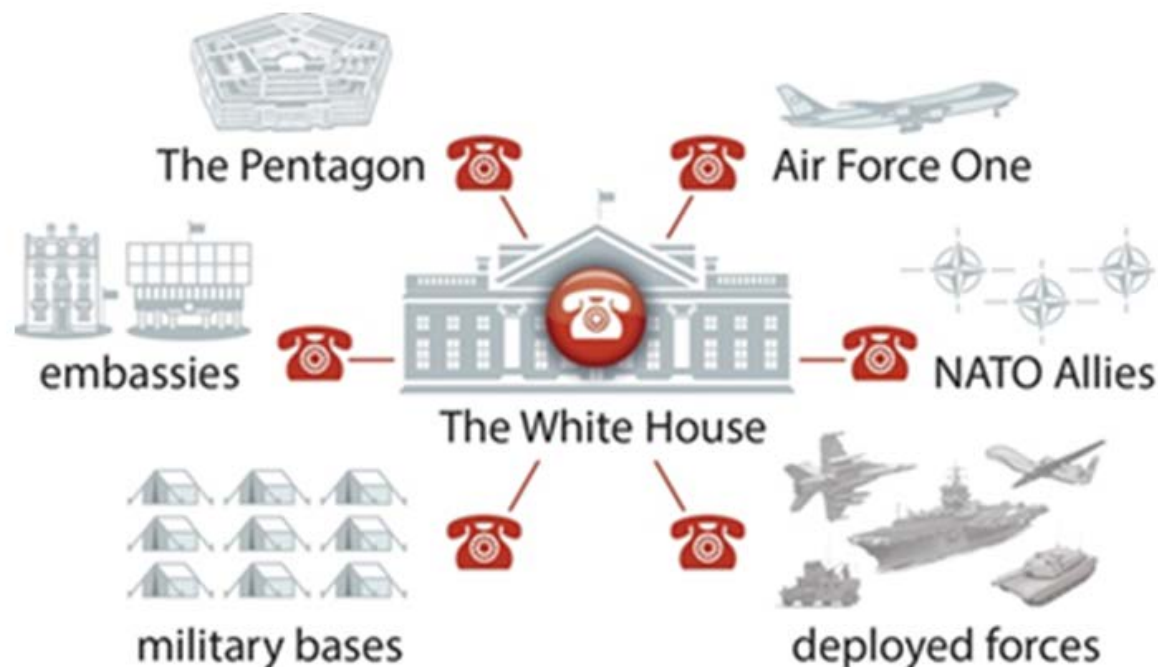
DISN Hybrid Signaling Design



Defense Red Switch Network: the ISDN era

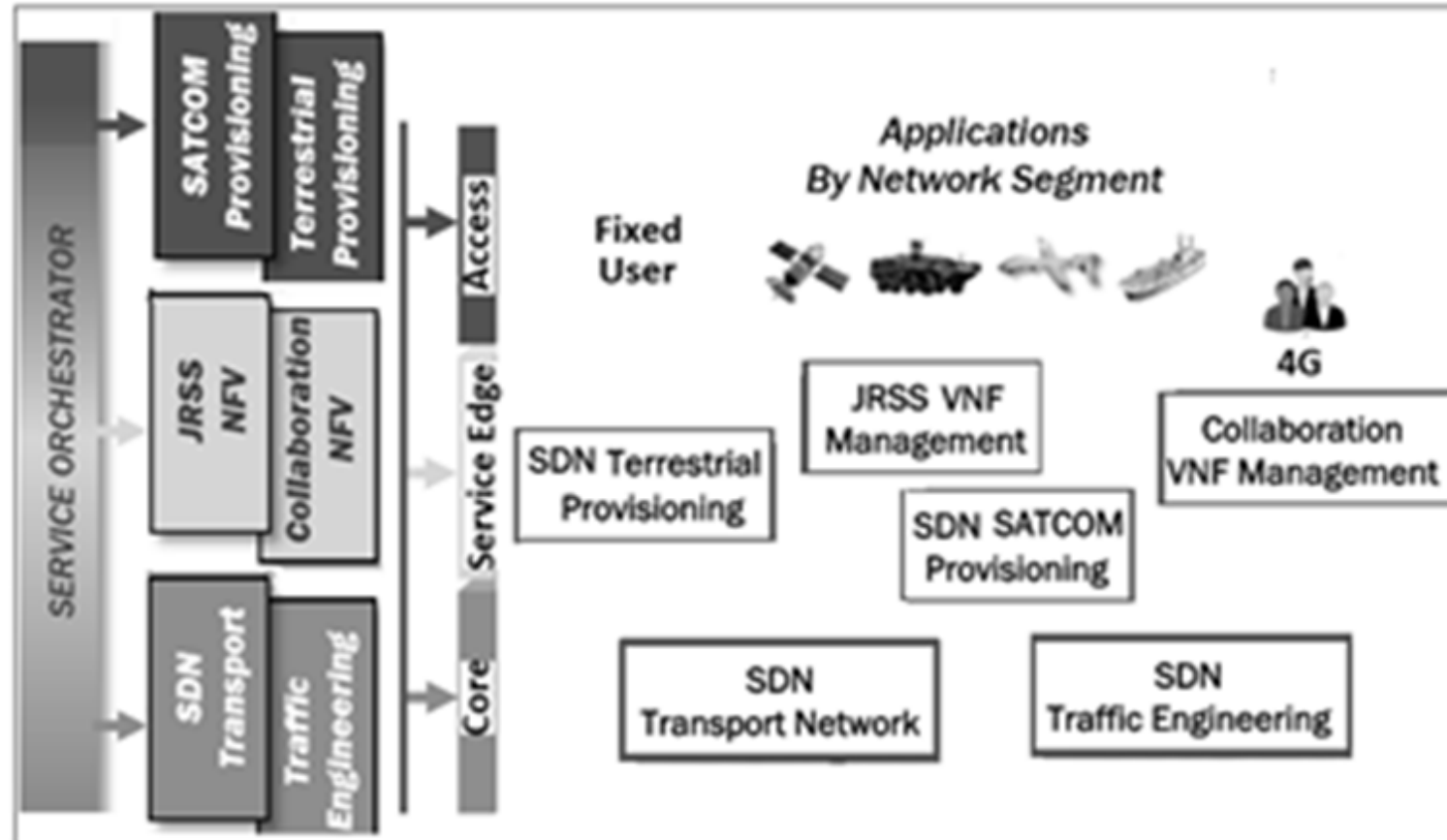


a) ISDN line; b) STE desk set. Note slot in front for Crypto PC Card and MLPP buttons

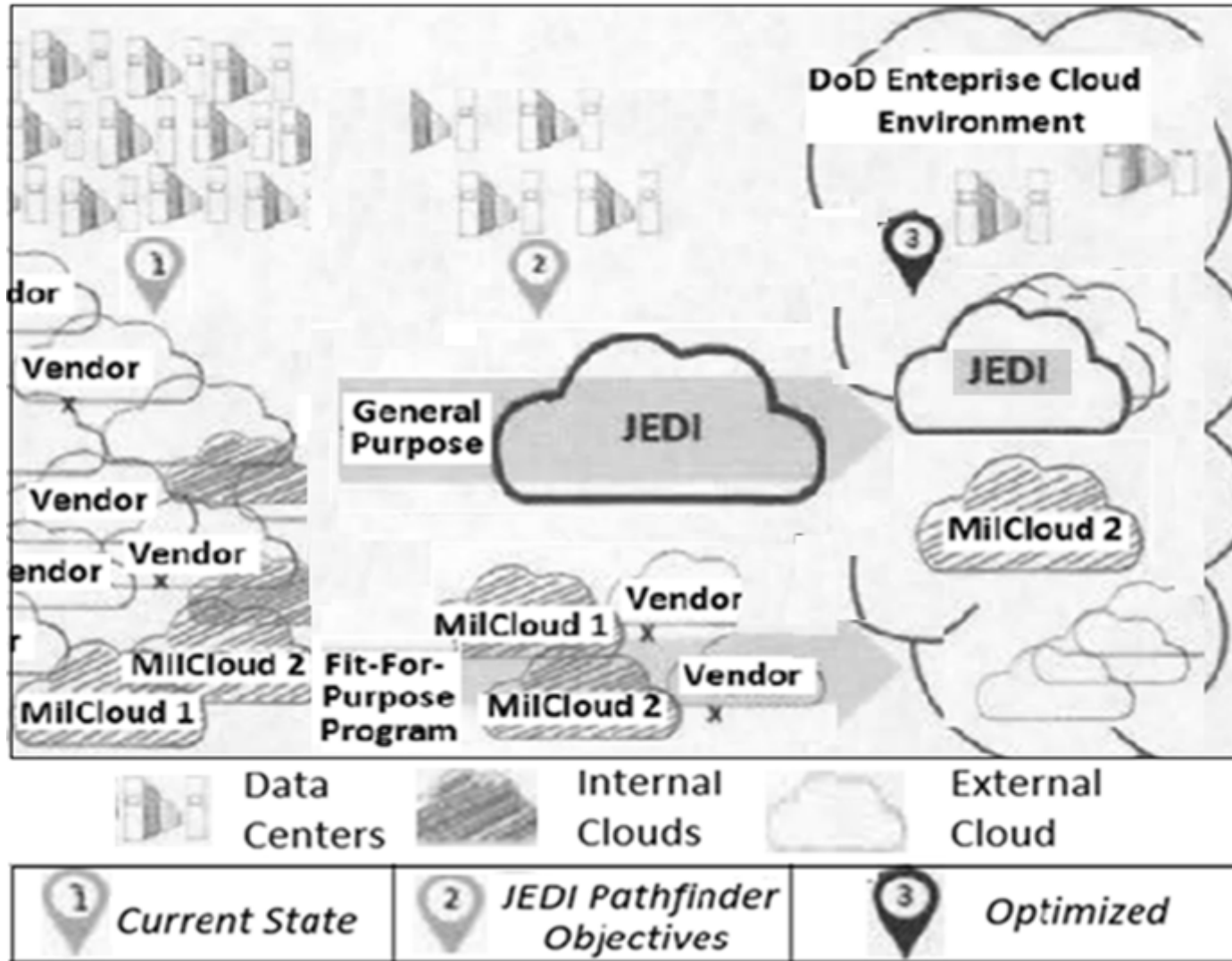


DRSN scheme

The newer achievements: SDN and NFV



Joint Enterprise Defense Infrastructure (JEDI) cloud initiative (2019)



Pentagon already is a multi-cloud environment: 500+ clouds

JEDI is the Pentagon's first major effort to create a highly-classified, cloud-based military command, control, communications and intelligence system

April 10, 2019. DoD confirms that Amazon and Microsoft are the winners of cloud contract: up to 10 years and **\$10 billion**

Summing up

The most fundamental question about the ubiquitous DISN transition to IP technology arises.

Many DISA shortcomings leads to the following:

- 1) co-existence of circuit and packet switching
- 2) the future of the very transition to IP technology everywhere in the world is unclear at all.

Thanks!
Q&A

