THE C2 ARCHITECTURE AND INFORMATION SUPPORT OF THE CZECH ARMED FORCES

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The Future of Command … Control …

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1. Introduction

- The Czech Armed Forces (CAF)
  - Fully professional since January 1, 2005
  - Small, Modern, Dynamic, Young
- Complex information support in Command and Control (C2)
  - Modernisation project in CIS
  - National NNEC analysis

2. The Current State and the Future of the CAF C2IS 1/2

- The current state of the communication and information infrastructure is characterized as set autonomous ISs, not fully satisfied communications infrastructure and two C2IS (for ground and air forces).

- More that 10 administration ISs (financial, logistic, personnel, stuff, medical, military police etc.) have their own technology basis, application SW, security policy and data sources.

- There is partly integration at the E-mail system connection. The common IS is still missing for Command and Control (C2) functions.

- All ISs include not only specific business process functions, but the common services as office automation, intranet, E-mail etc. The services are realized thru multiplatform solution, so that user of more IS must be connected to every IS with extra PC.

2. The Current State and the Future of the CAF C2IS 2/2

- This situation is for small CAF very complicated and uneconomical. The future is in Cross-Sectional (C-S) IS that should integrate all IS and include the missing functionality.

- C-S IS will be solved as a secure communication and information system (CIS) supported of this operational capabilities:
  - C2 at the strategic, operational and tactical level.
  - Control and administration shape for force goals, planning, military activities, NATO cooperation, effective military education and training.

- Modernization Projects include 3 directions of development:
  - Cross-Sectional IS,
  - Communication infrastructure,
  - C2 system for tactical level.

3. The Cross-Sectional IS 1/8

3.1 The basic concept of C-S IS

- The basic concept of C-S IS involve process orientation, integration of existing IS, development of missing functions in information support of MoD and CAF. The military professionals need an integrated environment to access information and to help business processes.
- The principle idea is the NATO Bi-SC AIS and architecture approach with operational, technical and system view. This architecture should be an open architecture useful for any enlargement, for IS integration and business processes support.
- C-S IS should prepare an integrated environment to the Functional Application Services (FAS) for command, control, administration area, and crisis solution.
- The IS integration is based on unify user interface (Portal) to various kind of Infrastructure Services, Common Services, and Functional Area Services. The WEB portal is a useful technology for unified information access.

3. The Cross-Sectional IS 2/8

3.1 The basic concept of C-S IS

- Business processes than will be by C-S IS supported:
  - The main processes:
    - CAF construction and military training.
    - CAF deployment.
  - Control processes:
    - Strategic, doctrinal and conceptual documents preparing.
    - Defense planning and provision.
    - Supervision of processes.
  - Assistance processes:
    - Personnel and financial resources.
    - Logistic and CIS support.
    - Security and intelligent activity.
    - Medical service.
    - Legal service.
    - Public relation.
- The development of C-S IS will be realized in incremental matter.

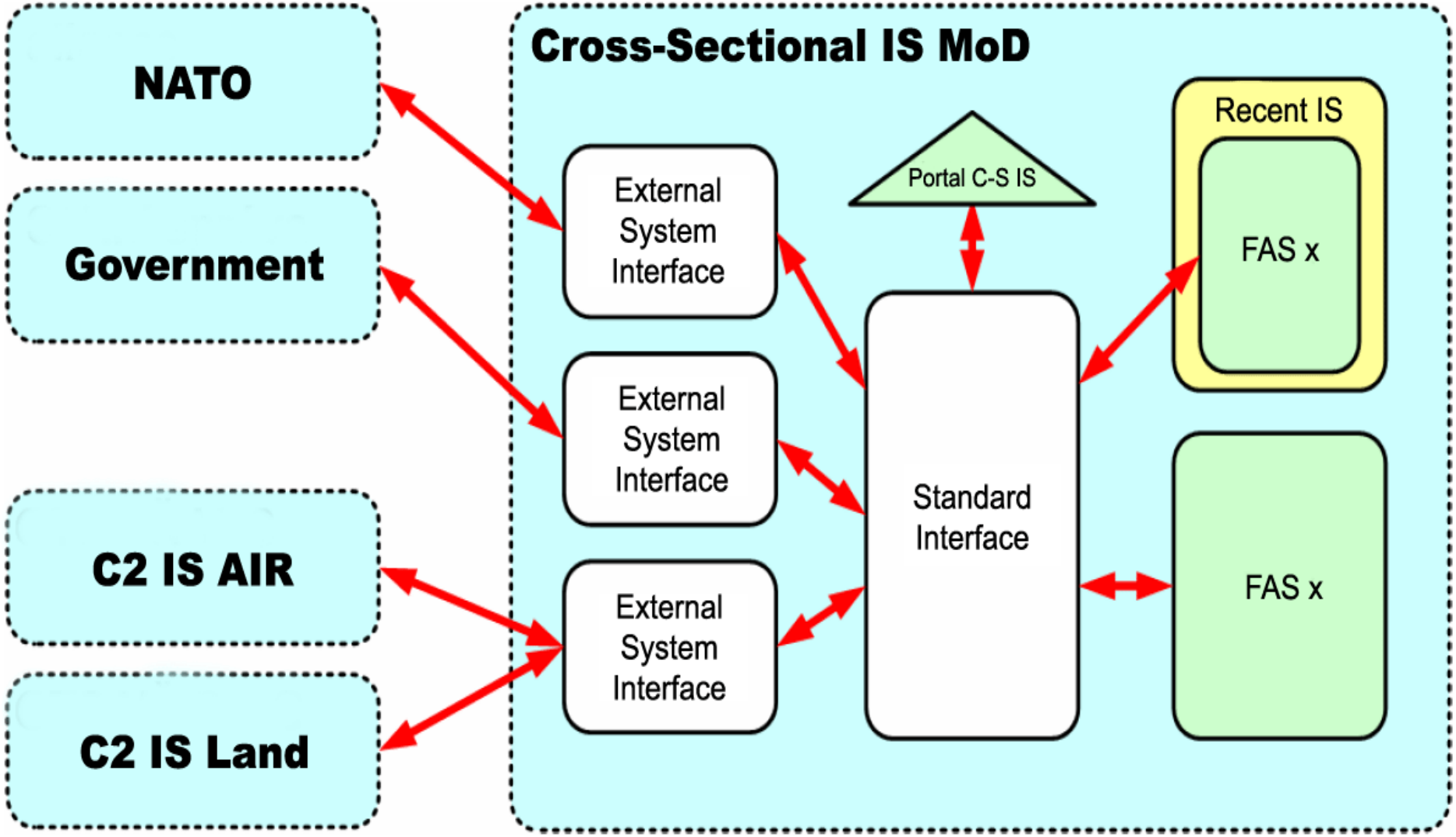

Fig. 1 C-2 IS architecture in IS environment

3. The Cross-Sectional IS 3/8

3.2 C-S IS Infrastructure Services

- Infrastructure services should support the data flow and are used by applications:
  - The Directory Services,
  - The Private Key Infrastructure,
  - Security Audit Services,
  - Database Services,
  - Management Domains,
  - Management Domains.

3.3 C-S IS Common Services

- The common services are defined for the support of the data performance and standard operation in the network environment. These services include messaging, office automation, exchange gateway, systems administration, document management and archive, security management, portal.
- Common services are in current state implemented in any IS its own matter and are not standardized. The suitable way is to separate and exclude them from IS and operate them unify in C-S IS environment.

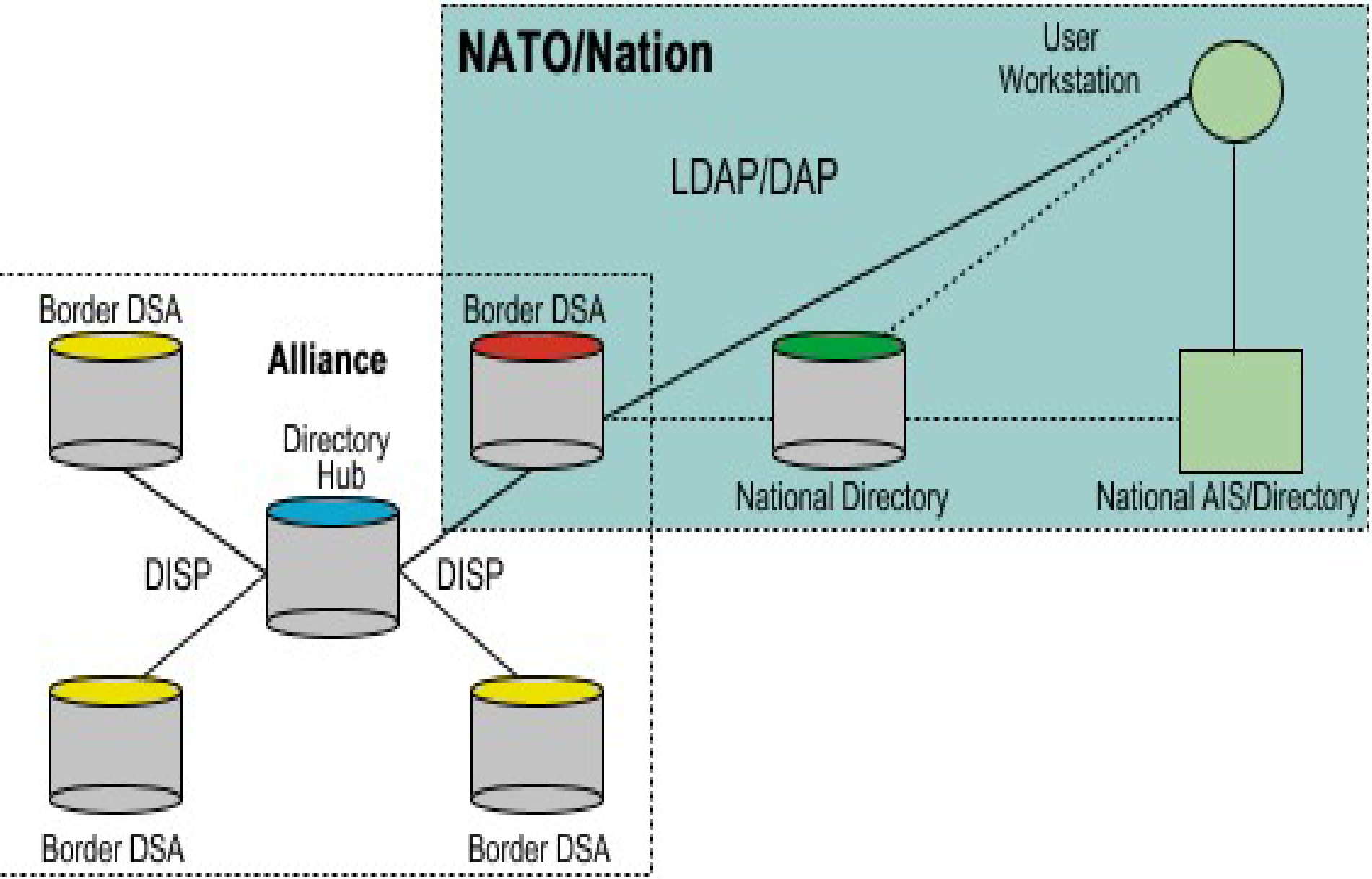

Fig. 2 C-2 IS Concept of Directory Services

3. The Cross-Sectional IS 4/8

3.4 C-S IS C-S IS Functional Area Services (FAS)

- Functional Area Services (FAS) are a set of integrated applications, databases and associated tools for decision support. They are designed according to operational requirements appropriate MoD Departments. The IS integration into FAS is an unify user identity thru the whole systems. Access will be available thru the standard interface or thru the terminal services.

- There is a list of FASes integration:
  - The Standard C/S IS Interface implementation on basis of http/XML services direct into environment existing IS.
  - The proprietary interface implementation between standard interface and existing IS. There is the case that existing ISs are not fit to Bi-SC AIS model requirements.
  - Connection to C-S IS using the terminal services. This is the case that is not useful for both above mentioned variant.

3. The Cross-Sectional IS 5/8

3.4 C-S IS C-S IS Functional Area Services (FAS)

- There is a list of individual FASes:
  - Common Operational Picture.
  - Common military operations.
  - Air military operations.
  - Land military operations.
  - Intelligent and reconnaissance.
  - Operational planning and analysis.
  - Personnel.
  - Logistics.
  - System of electronic marketing.
  - Communication and information systems.
  - Geographic and hydrometeorology information.
  - Military police.
  - Public relation.

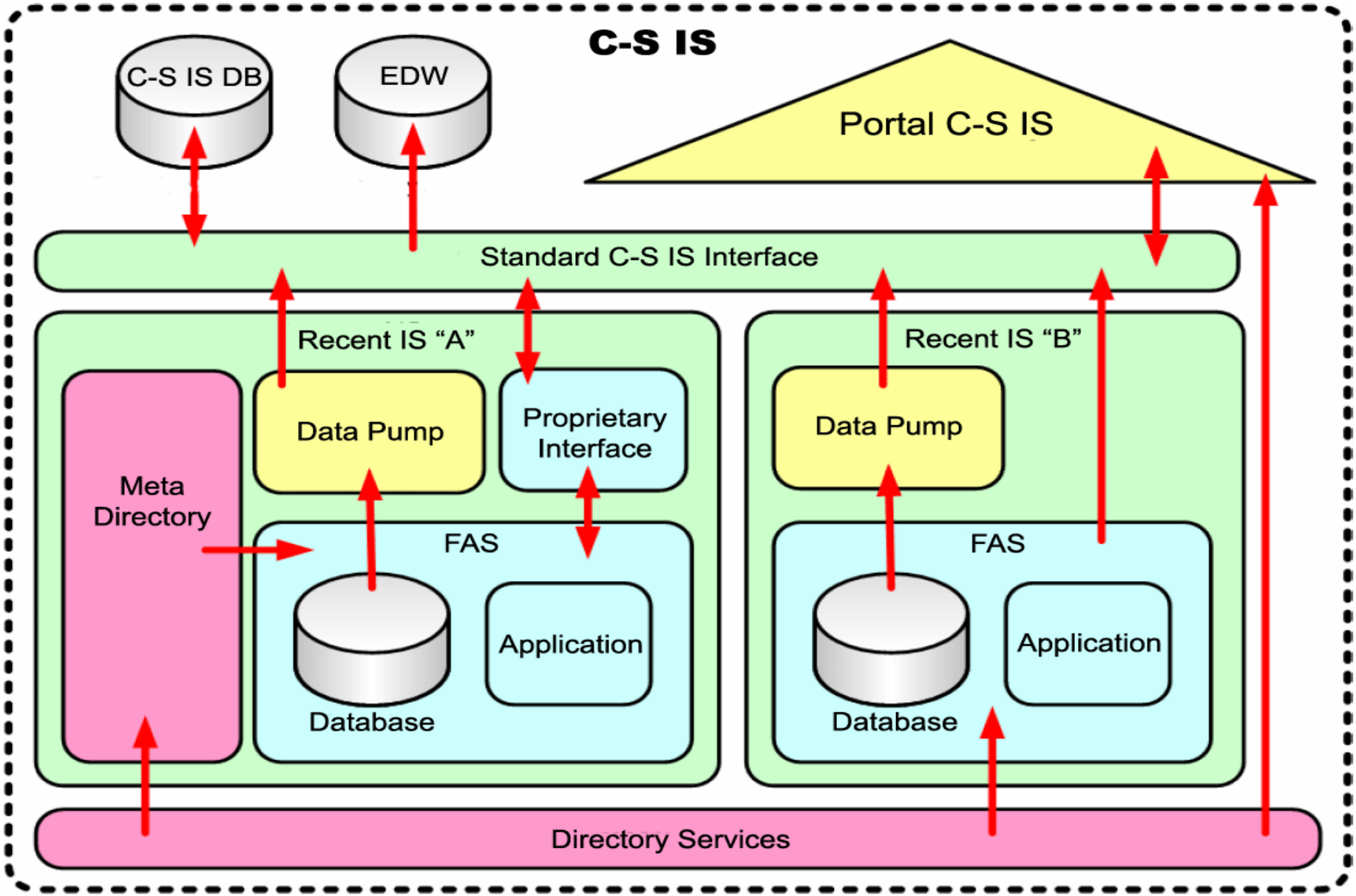

Fig. 3 The relations FAS in C-S IS environment

3. The Cross-Sectional IS 6/8

3.5 One Access Point

- The WEB portal is ***one access point*** to information in C-S IS. Portal includes some services that are necessary for cooperation of common services and FASes.

- List of one access point parts:
  - Single Sign On,
  - Unify user‘s interface,
  - Dividing services into subsystems (domains),
  - Unify application‘s interface (Standard C-S IS Interface),
  - Data exchange,
  - System auditing,
  - System accessibility.

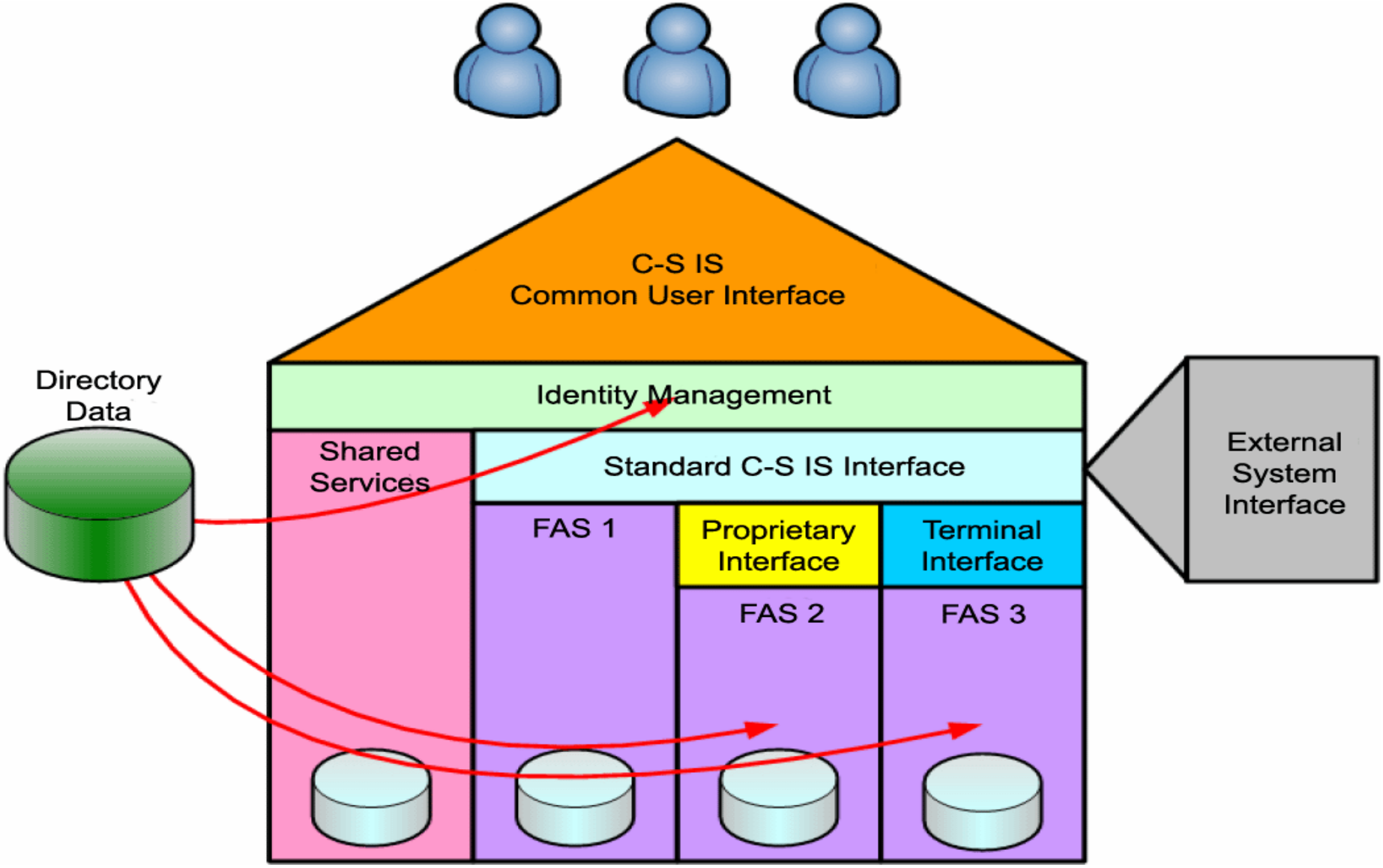

Fig. 4 The concept of the services architecture

3. The Cross-Sectional IS 7/8

3.6 The Architecture Approach

- There are basic NATO architecture documents available:
  - C3 SYSTEM ARCHITECTURE FRAMEWORK.
  - C3 SYSTEM INTEROPERABILITY DIRECTIVE.
  - C3 Technical Architecture (ADatP-34).

- NATO Architecture Framework document critique:
  - There was mentioned above that C-S IS was designed according to NATO Architecture Framework (NAF) document.
  - This document is not mature enough by our experiences. The main problem is with templates that have sometimes mistakes according theoretic models (by compare to original methodologies) and templates are very simple unrealistic to IS praxis.
  - There was probably missing a testing phase of NAF at real systems.

3. The Cross-Sectional IS 8/8

3.7 The Data Model

- Data model includes databases and data warehouse.

- Databases are organized according to FASes that support every day activities of military and administration officers by command, control, consultation, economic, financial, personnel, and logistics operations. Data in databases will be prepared, stored and manipulate by every day operations of users.

- Data warehouse (DW) is organized for support of decision makers in complex problems of CAF mission, force goals, effective economy and optimal personnel resources. Data into DW are prepared (ETL-extract, transform and load processes) from databases thru data pumps in regularly time period.

- There is a problem of preparing one complex enterprise data warehouse (EDW) in cooperation with decision makers. They mostly have no interest about technical decision support. The next cardinal question is low quality of data (author's experiences in preparing of DW prototypes).

4. C-S IS realization

- Information about C-S IS was ideas from the feasibility study and our research activities. The current state is an awaiting phase for the acquisition process. It can take one or two years. There is fortunately a lower quality in a project bringing in realization phase.

- The main strategy in this situation is preparing the “integration isles” that will correspond with C-S IS vision and future development.

- One of those isles is metainformation system (MTIS) of MoD that was started two year ago. This system should collect all MoD data structures and domain values. There is a large task, because it includes some hundredths elements from the various IS.

- The MTIS was analyzed, designed and developed according to the latest IS methodology. There was started with process analysis and process design. Process management was followed by object design using UML. The next stage was Java programming. The MTIS is a dynamic WEB application with Oracle database.

5. Conclusion

The primary thema of the paper is C-S IS that is the basic stone of the CAF information support.

There was mentioned the main approaches to construction, problems by its realization and some interrelation ideas.

The C-S IS is for CAF

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