DEFENCE R&D DÉFENSE

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All-source Information Management and Integration for Improved Collective Intelligence Production

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Outline

- Context
- All-Source Intelligence
- All-Source Information Management challenges
- Geospatial Data Management
- Service-based Information Management and Integration Framework
- Conclusions and Perspectives

Context and objectives

Army/Intelligence context

- Increasing amount of data/information to be managed
  - Stored in distributed , stove-piped systems
- Multi-sources: SIGINT, IMINT/GeoINT, HUMINT, OSINT, etc.
- Various formats: sensor data, multimedia (text, images, audio, video)
  - Hard/soft, structured/unstructured
- Dynamic real-time data vs static/historical data
- Information overload

Objectives

→ Make data accessible, discoverable, integrated and disseminated

→ Integrated approach for information management and integration

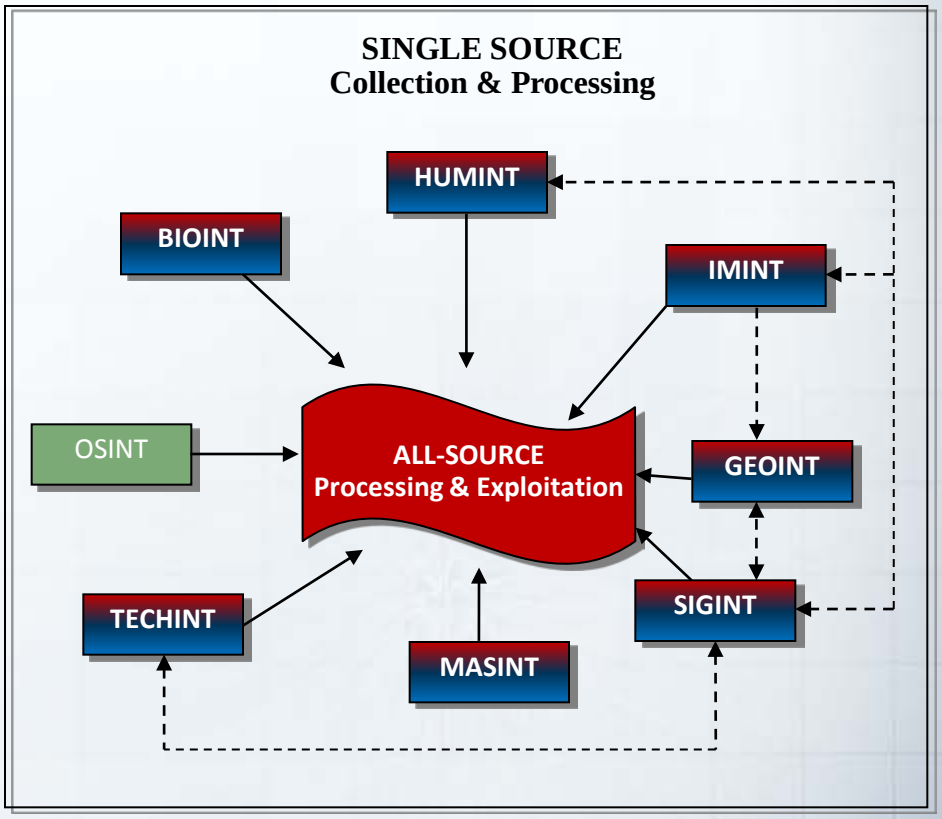
→ User-oriented services for enhanced access and exploitation

→ **ASIM** (All-Source Information Integration and Management) R&D Project

All-Source Intelligence

All-source intelligence is the products, organizations, and activities that **incorporate all sources of information and intelligence**, including OSINT, in the production of intelligence.

All-source intelligence is both a separate intelligence discipline and the name of the process used to produce intelligence from multiple intelligence or information sources. (*US Army doctrine for intelligence FM-2.0*).



Single-Source / All-Source Intelligence Production

SIGINT

HUMINT

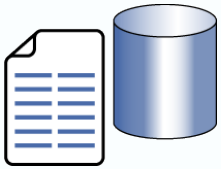
GeoINT

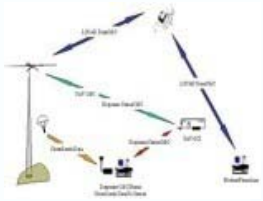
IMINT

MASINT

OSINT

...





Filter, index, organize

Analyze, fuse, synthesize

Evaluate

Disseminate

Collection

Processing

All-Source Information Management

- **Multiple sources and formats** (structured / unstructured)
  - Better describe, characterize information (metadata)
  - Make information accessible, discoverable, retrievable, exploitable
    - Automated metadata tagging
  - Facilitate information correlation among multiple sources

- **Exploitation of Standards**
  - Metadata
    - Information content (what, who, where), context, administrative
    - ISO, NATO, OGC (geospatial)
  - Ontologies (common terminology)
    - Formal semantics of objects
    - Integration, mapping

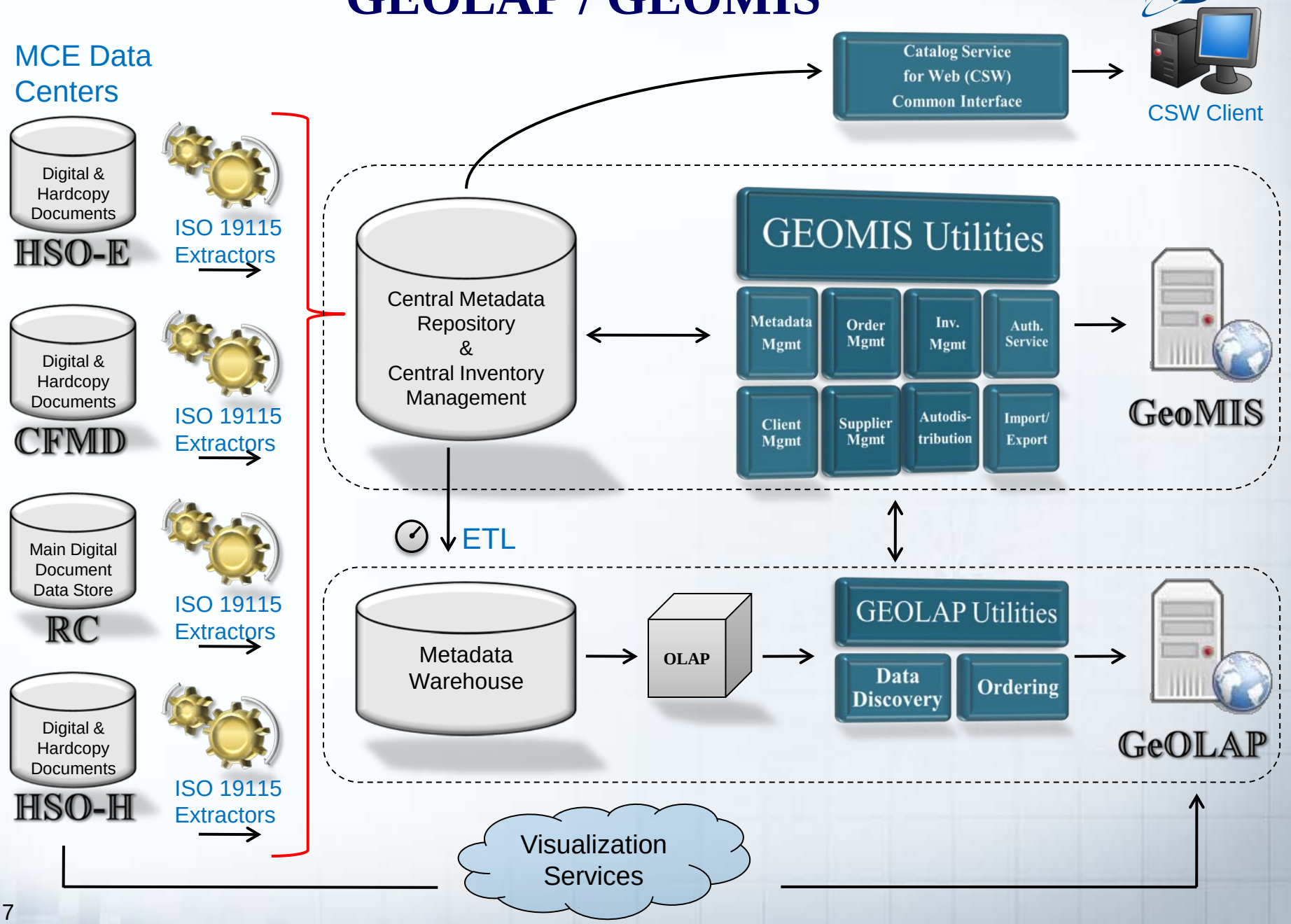
Geospatial Data Management

- **GeoMIS** (Geospatial Metadata and Inventory System)
  - Backbone infrastructure in the Mapping and Charting Establishment of DND to centrally manage all geospatial products
  - Manage large geospatial inventories through the use of metadata standards (e.g. ISO 19115).
    - Export to ISO 19139 XML, to KML

- **GeOLAP** (Spatial OLAP Data Discovery)
  - Provide a wide-audience online access to geospatial data holdings of DND through a map-based application.
  - Connected to GeoMIS, provide online visualization and ordering capabilities.

- **Extensions**:
  - Metadata exposed through OGC Catalog for the Web (CSW) implementation
  - Search and filtering capabilities

GEOLAP / GEOMIS



All-Source Information/Intelligence Integration

- Hard/soft data correlation in a All-Source context
  - Standardized annotation of information elements
  - Facilitate all-source information correlation

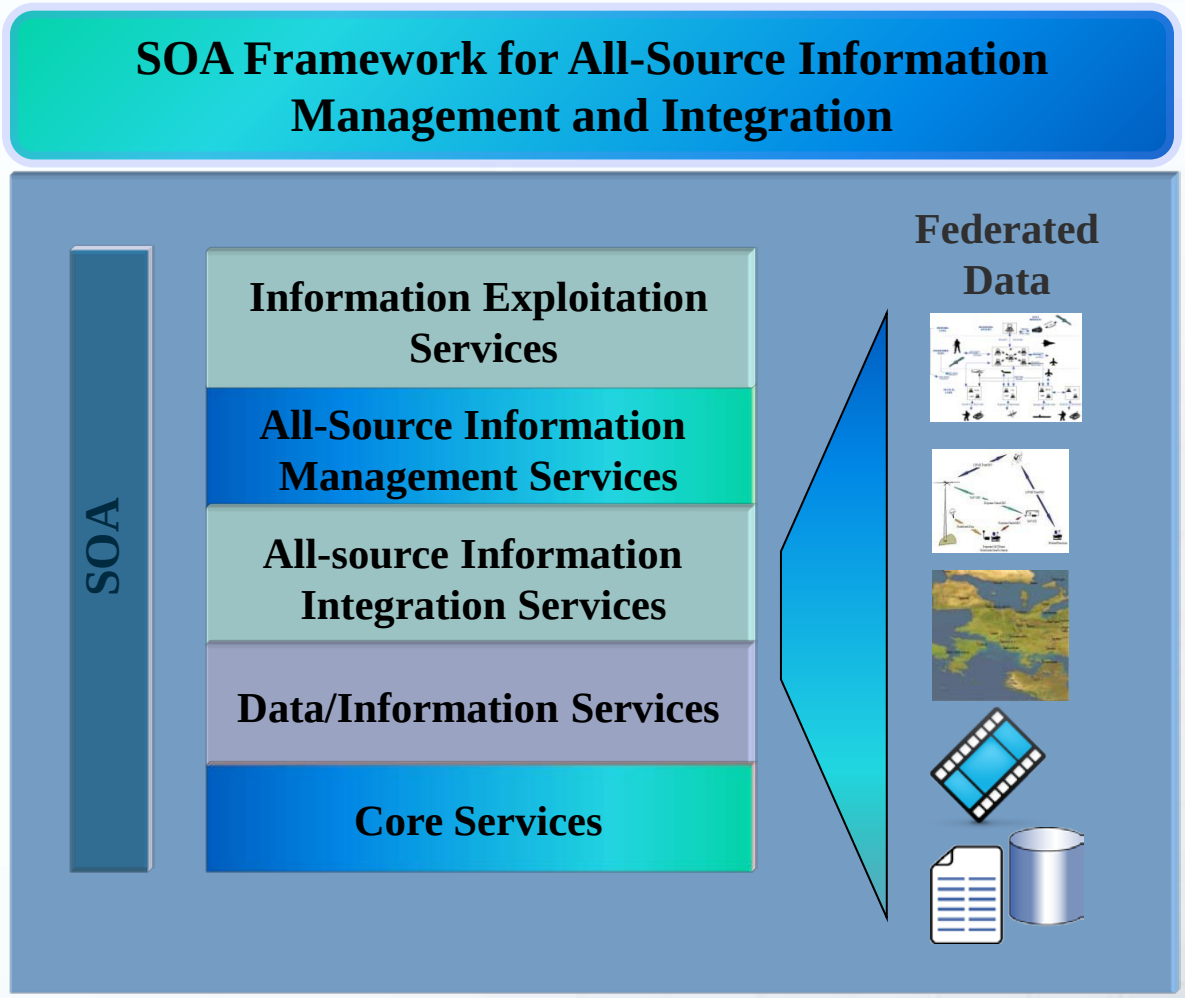
- Integration of metadata standards within a federated environment
  - Metadata developed by COIs
  - Metadata mapping across domains
  - Exploitation of domain ontologies (or upper-ontology)
    - Metadata (RDF), ontologies (OWL)
    - E.g. Mapping US DDMS to SUMO (Veres & Ng)

All-Source Information Management Framework

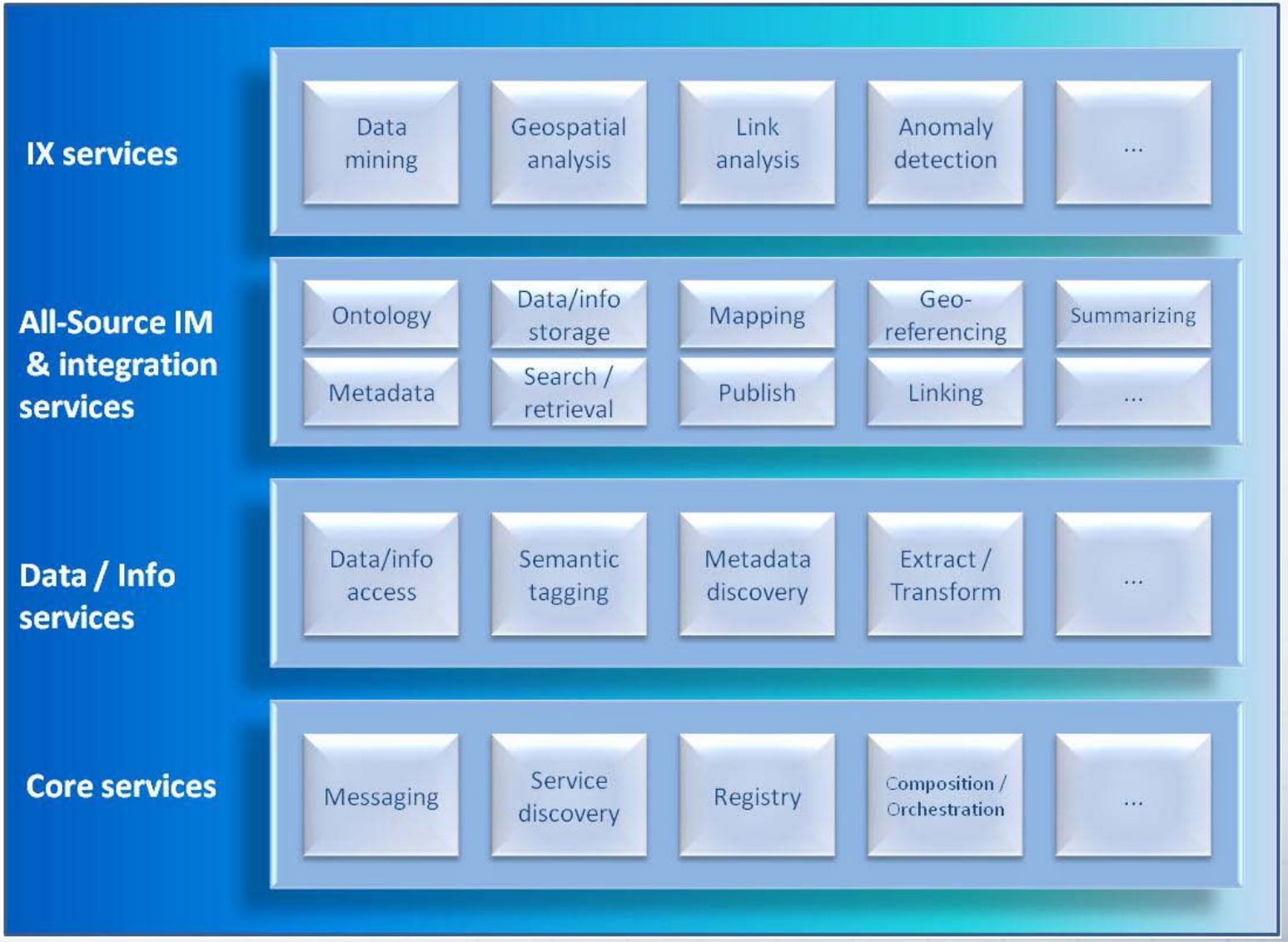
Objective: Provide a user-centric All-Source/Multi-int IM environment

- Service-based IM environment
  - Open and flexible architecture
  - Exposure of loosely-coupled distributed services
  - Focus on IM and integration
    - Data/information access
    - Discovery, search and retrieval, notification
    - Mapping, correlation, synthesis
  - Rely on Core services
  - Support of Information Exploitation (IX) services

ASIM Framework



ASIM Categories of services



Conclusions and perspectives

- Information Management Challenges in a All-Source context
  - Enhance description of intelligence information from multiple sources
  - Governance required for enhanced IM and information sharing
- Enabling Technology
  - Service-based IM Framework
  - Maximize use of open standards and semantic technologies
- Future work
  - Refine the framework for All-Source information Management
  - Cross-COI interoperability
  - Handling of large data sets
  - Align with MAJIIC-2 (multi-int perspective)
  - Related initiatives (OGC Fusion Standards Study)

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