Defense Information Systems Agency

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DoD Executive Agent for IT Standards: *Foundations for IT Standards Profiles Supporting DoDAF Technical View Implementations*

Dave Brown, Chief
DISA Standards Engineering Branch – GE331
4 June 2009

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Agenda

- Interoperability and Standards in DoD
- Standards Management Foundations supporting EA technology insertion
  - DoD EA for IT Standards Mission, Policy and Process
- Enterprise Architecture and Standards Profile Foundations Supporting Interoperability
  - Using standards and profiling to meet interoperability requirements
- Using GIG Technical Guidance to describe interoperable implementations for the technical component of EA
  - GIG Enterprise Service Profiles and their use in articulating engineering implementations for EA net-centric capabilities
  - Standards Profile Analysis Supporting Systems Engineering Decisions

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Operational Interoperability Governance Structure

Customer and User Community

Stakeholders

Produce Acquisition Documents Using "Interoperability" Guidance

Develop And Assess

DISA + + + **Combatant Commanders**

Enabling an Interoperable "WARFIGHTER" Community


The Joint
Interoperability
Mission

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Interoperability

- *INTEROPERABILITY DEFINITION: "The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together."*

Policy is in place to ensure "INTEROPERABILITY" is addressed in system development

POLICIES


8500 Series


6212


5000


4630

POLICIES GOVERNING INTEROPERABILITY

- ***8000 Series:*** The process by which data is registered and discovered
- ***6212:*** The process by which interoperability assessment and system certification occurs.
- ***5000:*** Establishes the acquisition development cycle (Milestones A, B, C)
- ***4630:*** Established responsibility for configuration management and compliance with interoperability Standards, Architecture and Testing.

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Standards Governance Approach for Interoperability

Policy –

- ✓Needed to define responsibilities of primary organizations
- ✓Establish repeatable and clearly defined processes

Standards –

- ✓Technology products that when implemented consistently improve interoperability both from "commercial" and "Military Standard" (Mil-Std) perspective and in terms of reduced developmental costs

Configuration Management And Governance –

- ✓The maintaining of interoperability standards baselines and refreshing of technology standards

Assessment and Testing –

- ✓Ensuring standards are reflected in requirements and engineering artifacts and physically tested for consistent implementation

Tools –

- ✓Designed to a aid in any of the above areas to expedite development coordination and access

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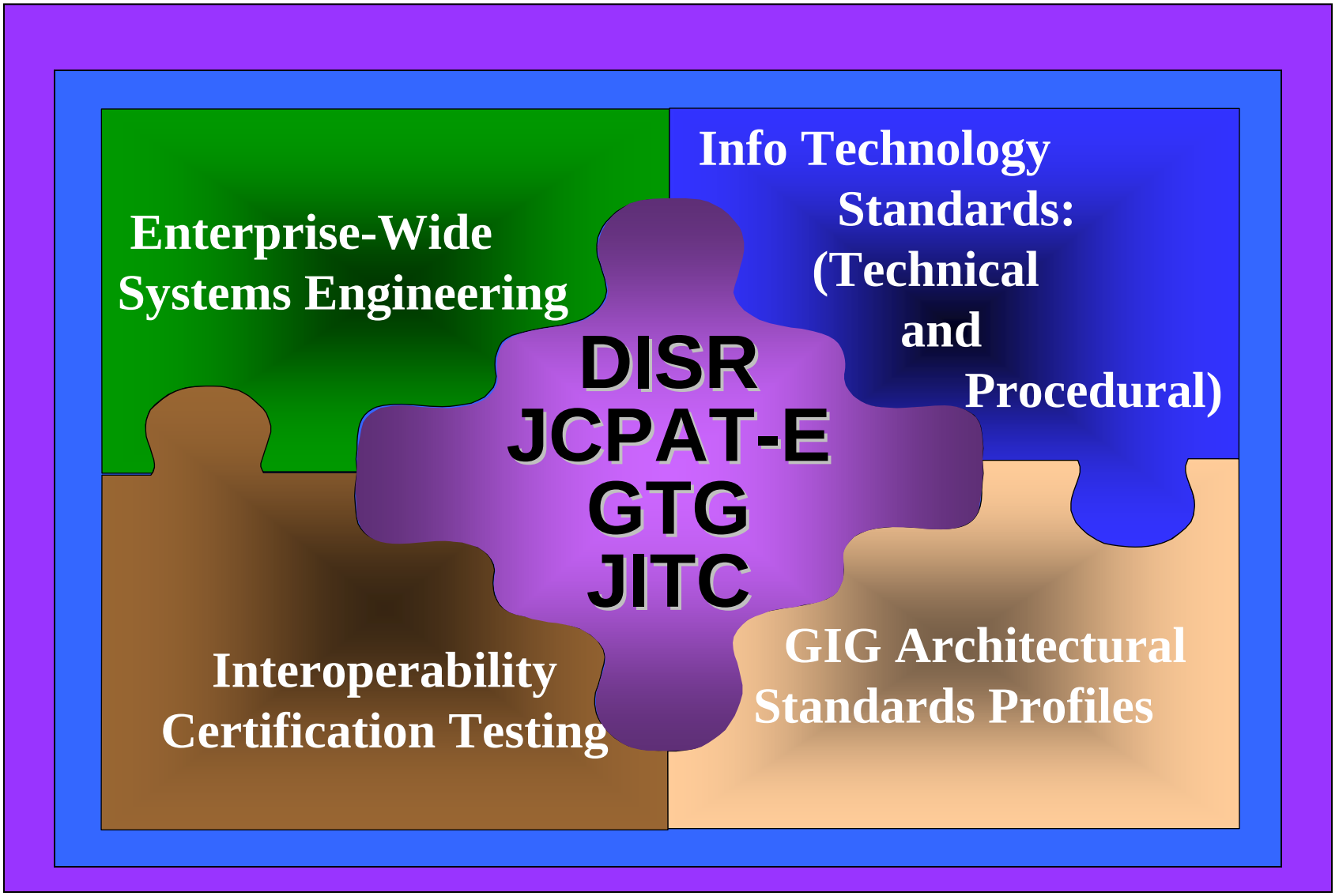
DISA Interoperability Support Elements



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DOD Executive Agent for IT Standards

•<u>Critical</u> DoD wide Responsibilities:

- DoD IT Standards Executive Agent with Direct Report responsibility to NII & JS on:
  - DOD IT Standards Registry (DISR)
    - Key Interface & Transport Technology Profiles
    - Defense Standardization Program Standardization Officer, MILSTDs & Non-Government Standards Body Representation
  - Joint Interoperability Tactical Command And Control Standards (JINTACCS)
    - TDL, MTF, VMF, Symbology
  - NATO IT Standards
    - STANAGS
  - Military IT Standards Coordination
    - Coalition Interoperability Program Bi/Multilateral Agreement Facilitation
  - Joint Staff Interoperability Requirements, Analysis & Assessment Support
    - Joint C4I Program Assessment Tool (JCPAT)
  - Enterprise Wide Systems Engineering
    - GIG Technical Standards Implementation Profiles
    - GIG Tech Guidance Config Mgt Processes and Tools

For which the Warfighters and System Developers are the primary customers…

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DoD Executive Agent for IT Standards Policy Overview

- DEPSECDEF Memo, subj, DoD Executive Agent (EA) for Information Technology (IT) Standards, May 21 2007:
  - **Reassigns DISA as DoD's IT Standards EA**
  - **Assigns responsibility to enhance DoD's interoperability and information sharing and to improve DoD information sharing among international, federal, state and local partners.**
  - **Directs that DoD responsibilities previously cited in DoD Directive 5101.7 "DoD EA for IT Standards" are to be codified under a DoD Instruction**
- Primary EA Responsibilities:
  - **Develop, Prescribe, and Implement IT and NSS Standards Throughout the DoD**
  - **Identify forward-looking IT standards to facilitate net-centric concepts/capabilities**
  - **Track, coordinate, and integrate all DoD IT standards activities**
  - **Participate in Commercial, Fed Gov, DoD, NATO, Allied, and Coalition SDOs serving as the primary DoD Rep to allied and coalition bodies and activities**
  - **Promote adoption of selected non-Governments standards as Federal standards**
  - **Develop Military Standards when commercial standards do not meet DoD needs**

Interoperability Policy Oversight

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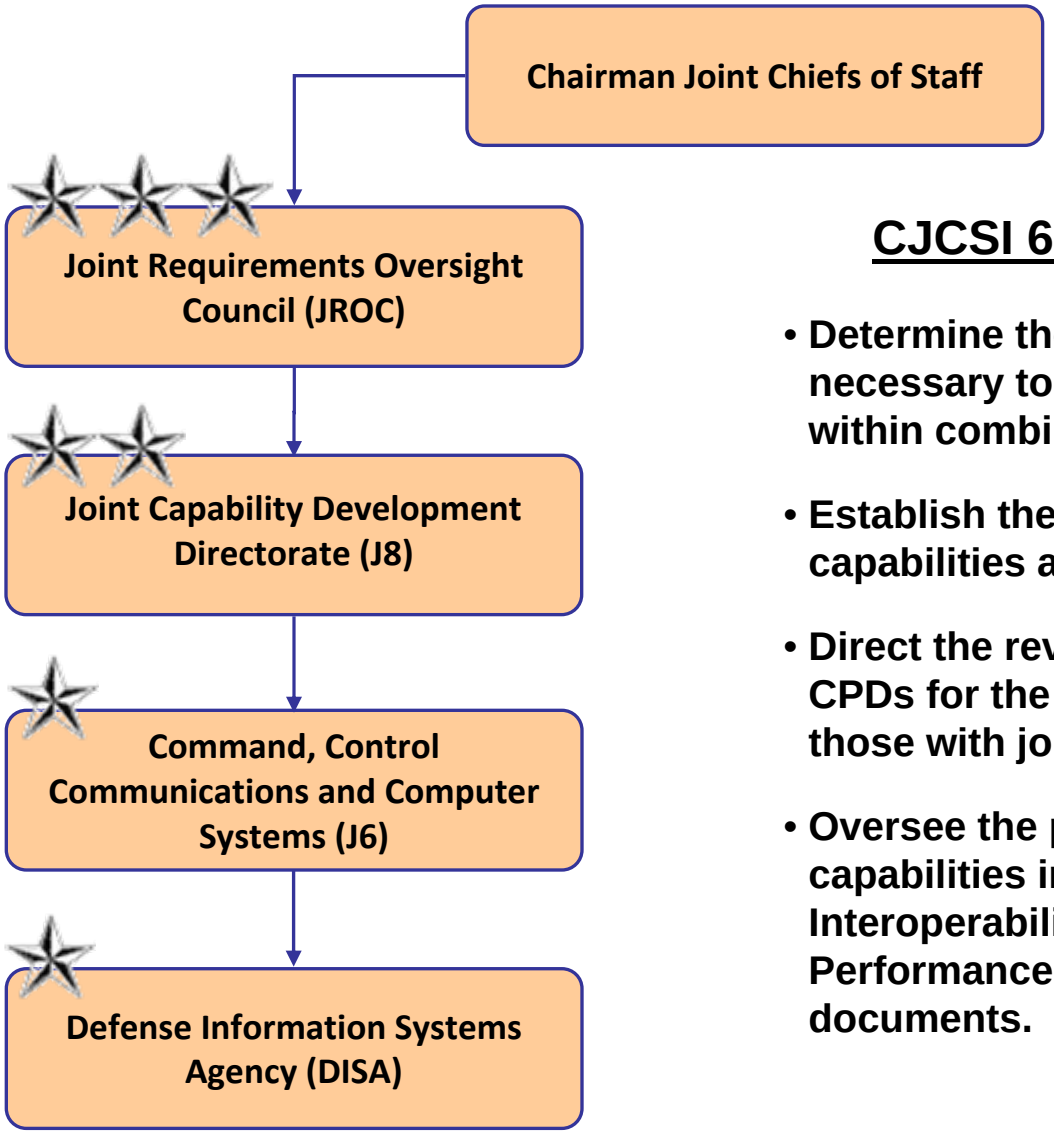

CJCSI 6212.01E Functions:

- Determine the joint capabilities necessary to achieve interoperability within combined and coalition forces
- Establish the procedures by which joint capabilities are validated
- Direct the review of all ICDs, CDDs and CPDs for the purpose of identifying those with joint war fighting impact
- Oversee the process for certifying that capabilities incorporate the Interoperability and Net Ready Key Performance Parameters into applicable documents.

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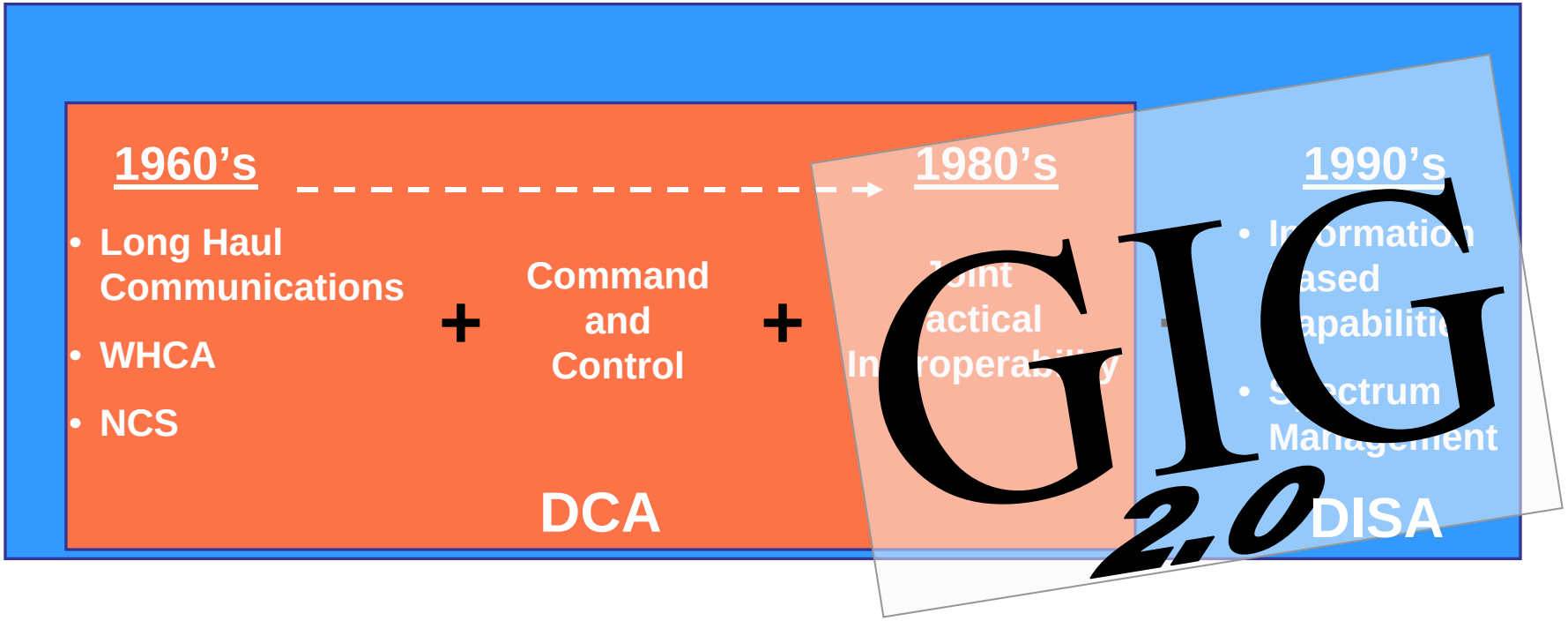
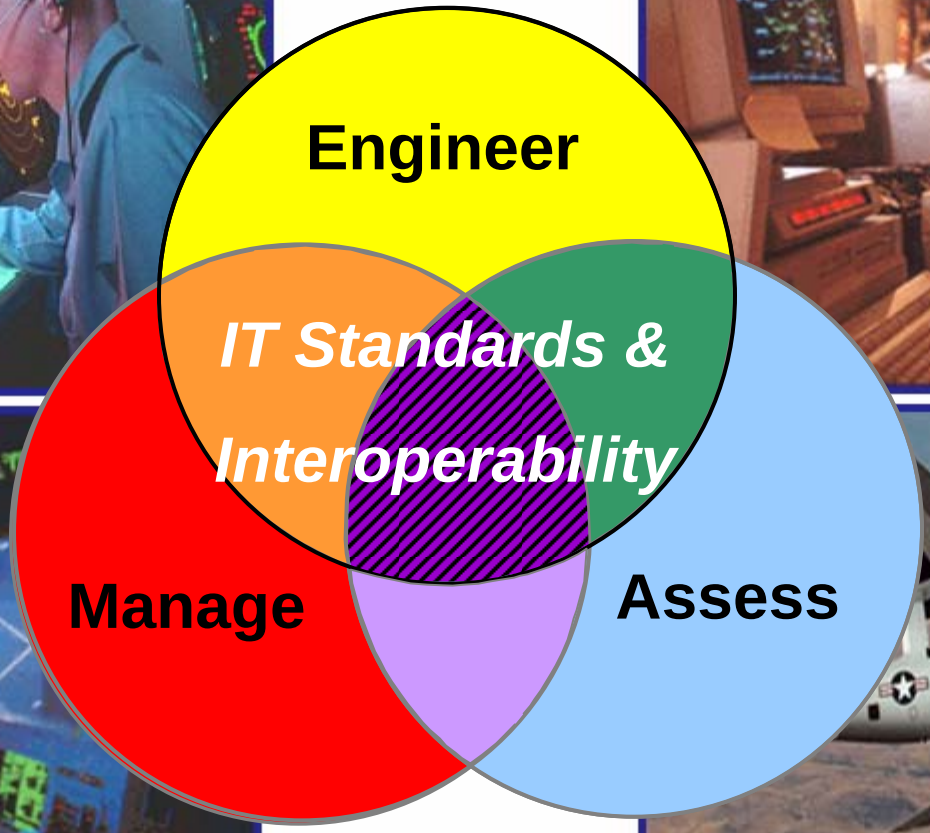
DISA Interoperability Mission Evolution



- Global Authentication/Access/Directory Services
- Information and Services From the Edge
- Joint Infrastructure
- Common Policies and Standards
- Unity of Command

DoD IT Standards Development



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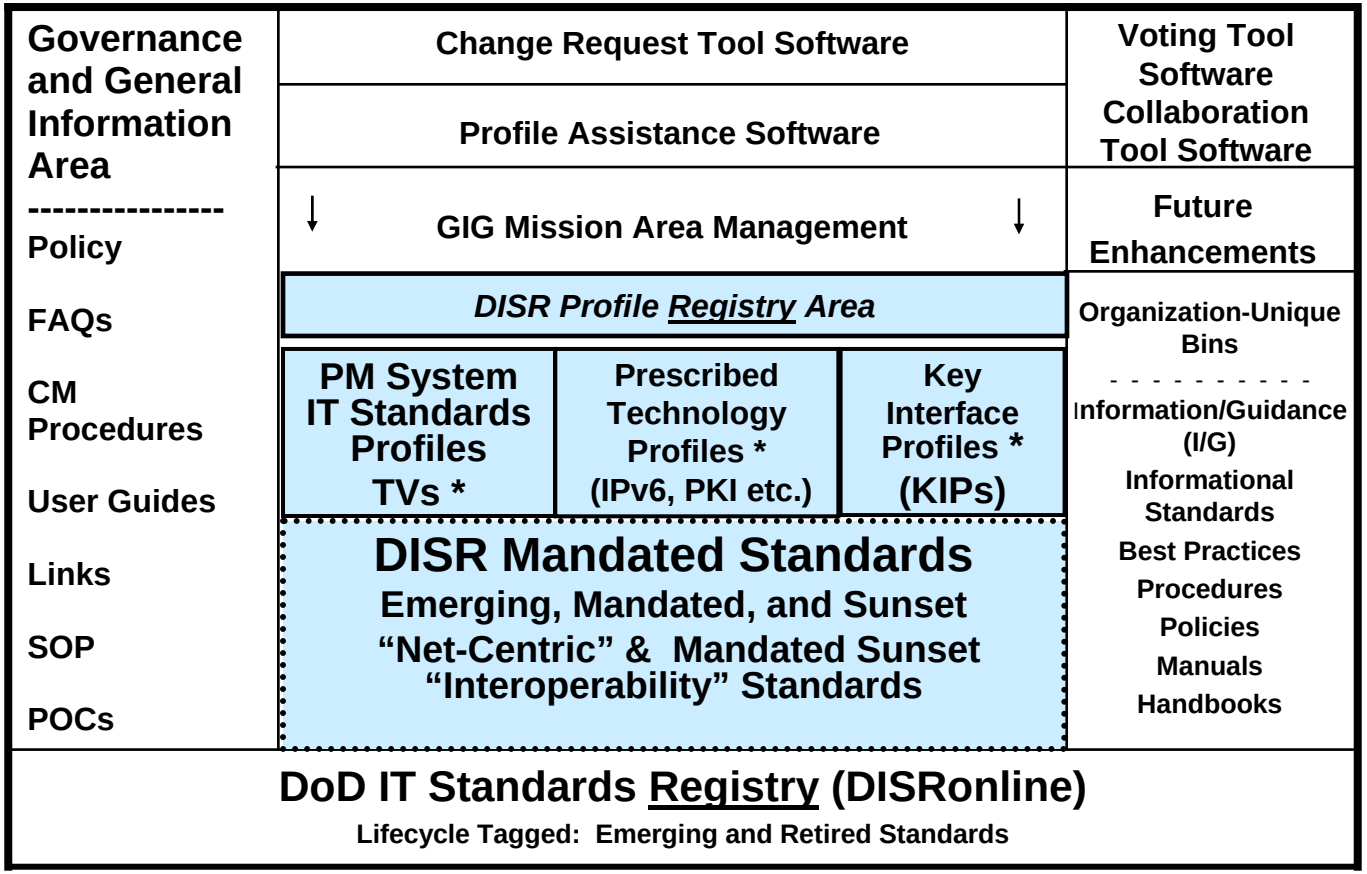
DoD IT Standards Registry (DISR) Overview



*** Transitioning to GIG Enterprise Service Profiles**

Objectives:

- Champion DoD's Re-Engagement of the IT Standards Communities
- Online IT standards Registry
- Tri-Annual Update of IT Standards Registry
- Tied to JCIDS IT Standards Conformance and Compliance Process
- Intelligence Community Cross Coordination (ICSR)
- Improved DoD Visibility and Participation in IT Standards Development Organizations
- Develop and Register PM Standards Profiles (TV)
- Standing IT Standards Working Groups Aligned to GIG Portfolio Management

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Definition of the DISR

The DoD IT Standards Registry (DISR) Prescribes the Minimal Set of IT and NSS Standards Needed to Achieve Interoperable IT and NSS Net-Centric Capabilities and Decision Superiority in Support of Net-Centricity.

Use of the DISR Standards Citations in Technical Standards View (TV) is Mandated for the Development and Acquisition of New or Modified Fielded IT and NSS Systems throughout the Department of Defense. **(Source: DoD Instruction 4630.8)**

STANDARDS IN AND OF THEMSELVES ARE A NECESSARY BUT NOT SUFFICIENT ENABLER OF INTEROPERBILITY AND NETCENTRIC INFORMATION SHARING!!!

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Profiles Defined

- **System Profile**
  - DISRonline Term for a Non-Published Profile
- **Technology Standards Profile**
  - Generic Profiles of Standards for a Major Technology Area
    - Examples: Collaboration, SMTP, PKI Medium, CISS
- **Key Interface Profiles (Currently migrating to GIG Enterprise Service Profiles)**
  - Application Enterprise Services, Computing Infrastructure and Transport
- **Technical View 1**
  - Published Standards Profile Used to Support the Systems and Interfaces in the SV-1
- **Technical View 2**
  - Published Forecasted Standards Profile: Consists of Emerging Standards and / or Emerging Profiles

Profiling Methods

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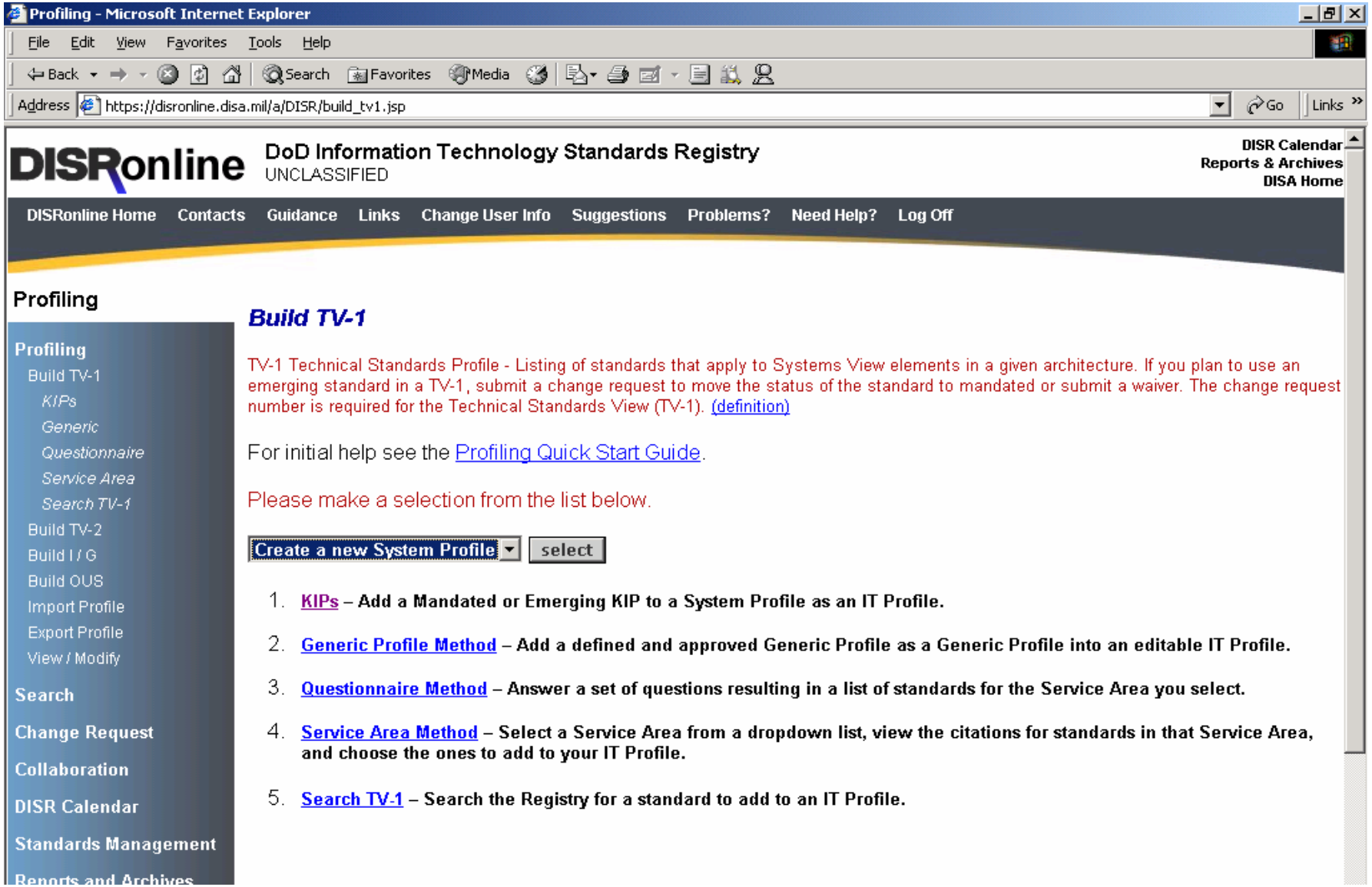

DISRonline Generated TV-1

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Unclassified

Technical Standards View (TV)

Standards Profile for jcpat system 1

DISR System Profile:	Bumblebee 18
System Description:	Stealth Attack Jet / Hover Craft
System Classification:	Unclassified
Created by:	Larry Spieler
Last Updated:	2004-07-01

IT Profile:	ground systems
IT Description:	a
IT Profile Classification:	Unclassified
Last Updated:	2004-07-01

Service Area	Standard Identifier	Title of Standard	Status
Global Air Traffic Management	FAA AC 90-94	Guidelines for Using GPS Equipment for IFR en route and Terminal Operations and for Non-precision Instrument Approaches in the US National Airspace System, 14 December 1994	Mandated
WS Aviation: Air Traffic Management	FAA AC 90-96	Approval of US Operators and Aircraft to Operate Under Instrument Flight Rules (IFR) in European Airspace Designated for Basic Area Navigation (BRNAV/RNP-5), 20 March 1998	Mandated
Global Air Traffic Management	FAA Notice 8110.60	GPS as a Primary Means of Navigation for Oceanic/Remote Operations, 4 December 1995	Mandated
Global Air Traffic Management	ICAO SARPS	Aeronautical Telecommunications, Annex 10 to the Convention on International Civil Aviation, Draft, 9 June 2000.	Mandated
Global Air Traffic Management	MIL-STD-291C	Standard Tactical Air Navigation (TACAN) Signal, 10 February 1998	Mandated
Global Air Traffic Management	RTCA DO-143	Minimum Performance Standards - Airborne Radio Marker Receiving Equipment Operating on 75 MHz, March 1970.	Mandated
Global Air Traffic Management	RTCA DO-229B	Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment, 6 October 1999.	Mandated
Global Air Traffic Management	RTCA DO-245	Minimum Aviation System Performance Standards for Local Area Augmentation System (LAAS), 28 September 1998.	Mandated
WS Aviation: Air Traffic Management	RTCA DO-246A	GNSS-based Precision Approach Local Area Augmentation System (LAAS) - Signal-In-Space Interface Control Document (ICD), 11 January 2000.	Mandated
Global Air Traffic Management	RTCA DO-247	The Role of the Global Navigation Satellite System (GNSS) in supporting Airport Surface Operations, 7 January 1999.	Mandated
Global Air Traffic Management	RTCA DO-253	Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment, 11 January 2000.	Mandated

Early NR-KPP Evaluation of Technical Views

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Net-Ready KPP	Threshold (T)	Objective (O)
All activity interfaces, services, policy-enforcement controls, and information exchange, in compliance with the NCOW-RM and GIG-KIPs, will be satisfied to the standards identified in the supporting integrated architecture products **and specified in the threshold (T) and objective (O) values.**	**100% of interfaces, services, policy-enforcement controls, and information exchange designated as enterprise-level or critical.**	**100% of interfaces, services, policy-enforcement controls, and information exchange.**

NR-KPP Required Integrated Architecture Products

Framework Product	Framework Product Name	General Description
AV-1	Overview and Summary Information	Scope, purpose, intended users, environment depicted, analytical findings
OV-2	Operational Node Connectivity Description	Operational nodes, operational activities performed at each node, connectivity and information exchange needlines between nodes
OV-4	Organizational Relationships Chart	Organizational, role, or other relationships among organizations
OV-5	Operational Activity Model	Operational Activities, relationships among activities, inputs and outputs. Overlays can show cost, performing nodes, or other pertinent information.
OV-6c	Operational Event-Trace Description	One of three products used to describe operational activity sequence and timing - traces actions in a scenario or sequence of events and specifies timing of events
SV-4	Systems Functionality Description	Functions performed by systems and the information flow among system functions
SV-5	Operational Activity to Systems Function Traceability Matrix	Mapping of systems back to operational capabilities or of system functions back to operational activities
SV-6	Systems Data Exchange Matrix	Provides details of systems data being exchanged between systems
TV-1	Technical Standards Profile	Extraction of standards that apply to the given architecture

NR-KPP Standards Compliance References

Has the TV-1 been prepared using applicable information technology standards profiles contained in the DISR?

Are the information technology standards for each applicable KIP technical view included in the draft TV-1 for the specific Joint integrated architecture?

Are the information technology standards in the NCOW-RM Target Technical View included in the Draft TV-1 for the applicable capability integrated architecture?

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Evolving Net Centric Requirements

- Improve NR-KPP compliance by providing PMs with Technical Direction on finding and implementing the standards needed to build and access GIG Capabilities
  - Leverage the DISR for the approved standards
  - Leverage KIPs to identify GIG Key Interfaces
  - Leverage the NCIDS/NCOW for Enterprise-Wide GIG Functional Capabilities Descriptions
  - Leverage Net Centric Programs for Architectures and Best Practices
  - Leverage DoD Components for analysis and validation

Support the PM to ensure he is “Net Ready”

GTG Standards Implementation Approach for Interoperability

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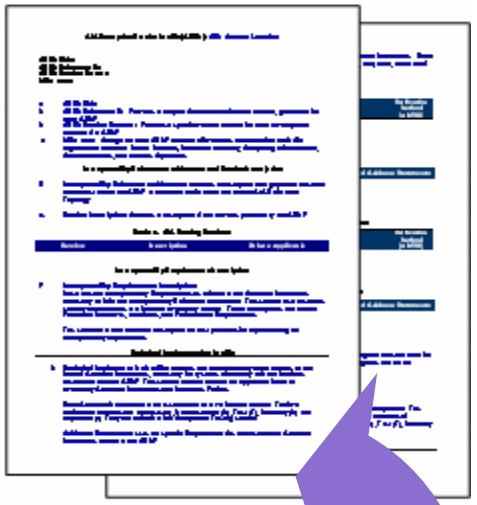
GIG Technical Guidance is:

- An evolving web-enabled information sharing capability providing the PM with technical guidance necessary to build or access interoperable and supportable GIG capabilities built on net-centric principles and solutions.
- An authoritative, configuration-managed source of technical standards implementation guidance that synchronizes GIG requirements and NR-KPP compliance
- Contains GIG Enterprise Service Profiles (GESPs) that are developed in a managed process vetted by a cross DoD Configuration Management body
- Regularly promulgated by OSD/Joint Staff as versioned technical baselines

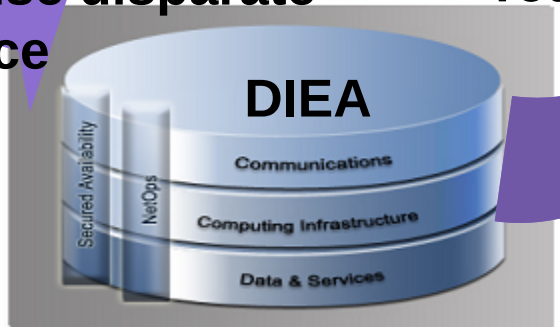
Before: Overload

After: GTG/GESP



Organize and condense disparate guidance

Manage and deliver evolving, actionable set of consistent technical requirements



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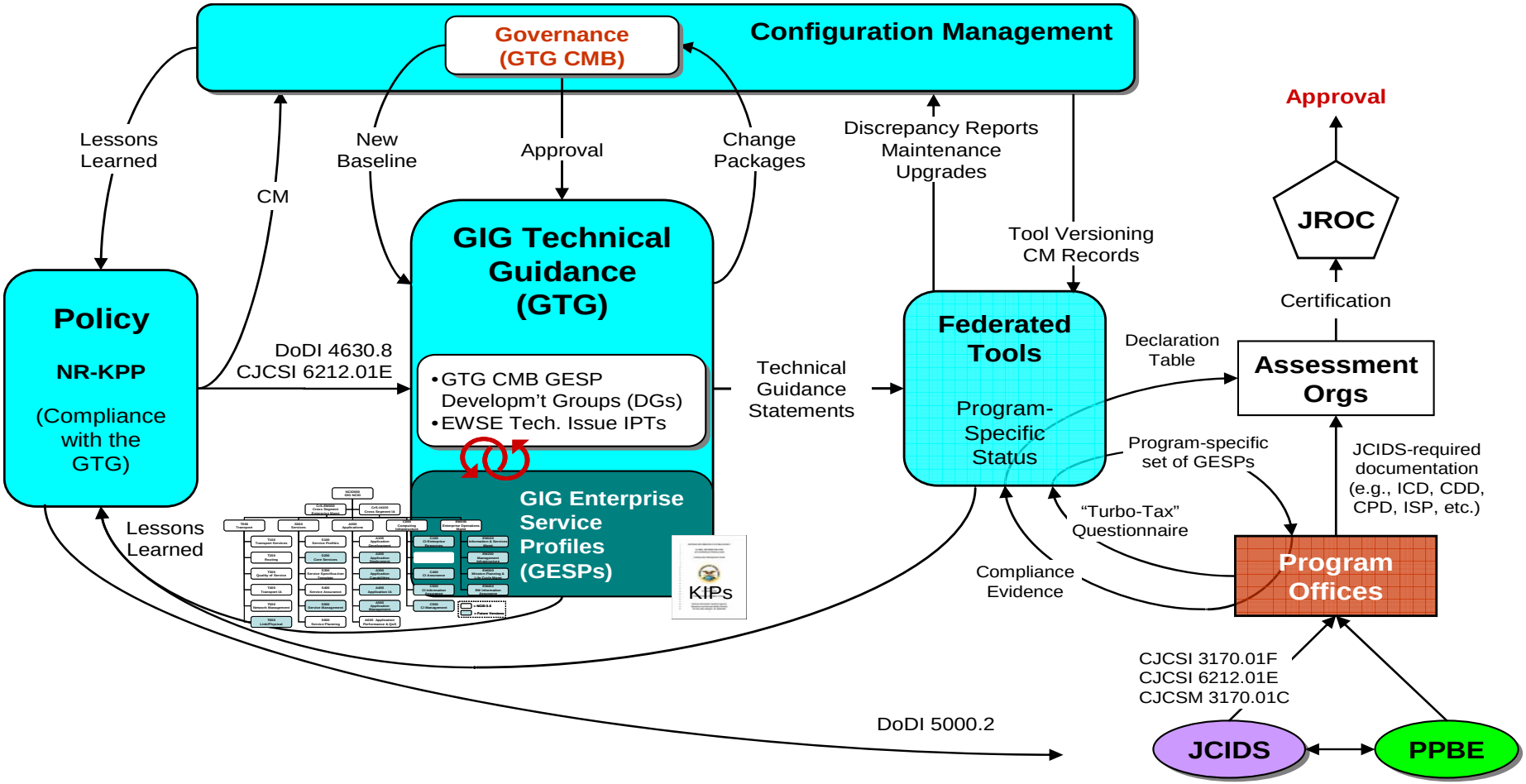
Efforts to Date:Evolving Policy, Processes and Tools

- **GTG Policy, Governance, CM, and Assessment processes found in CJCSI 6212.01E**



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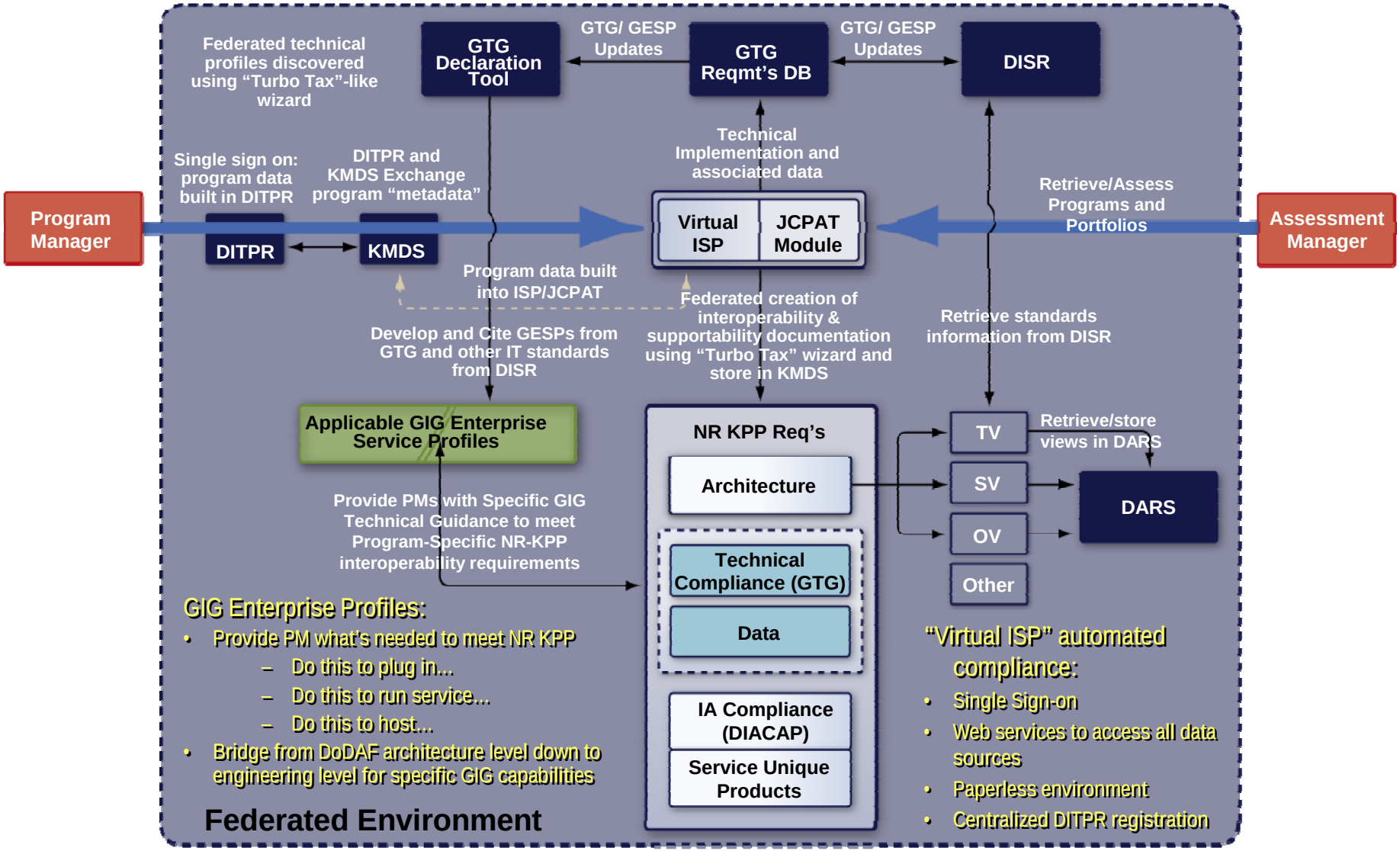
GIG Technical Guidance Overview



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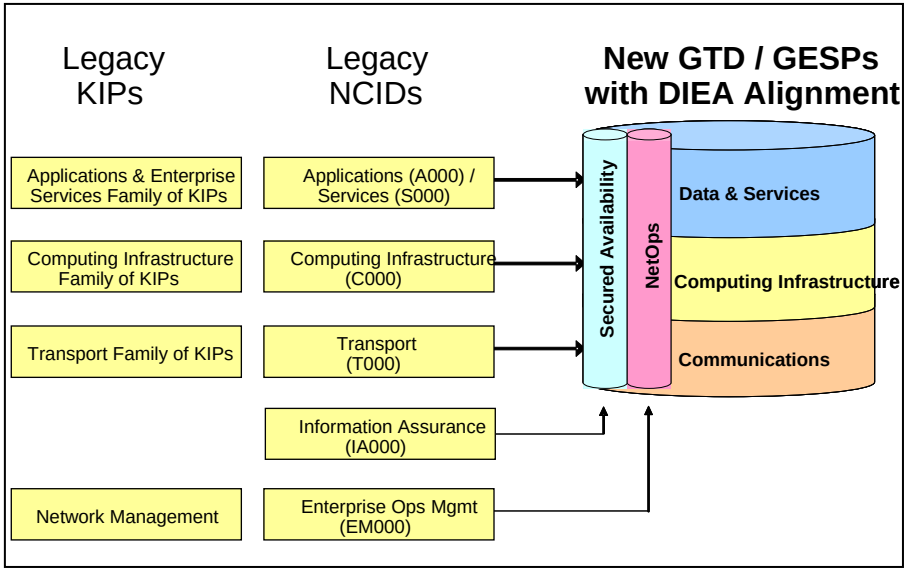
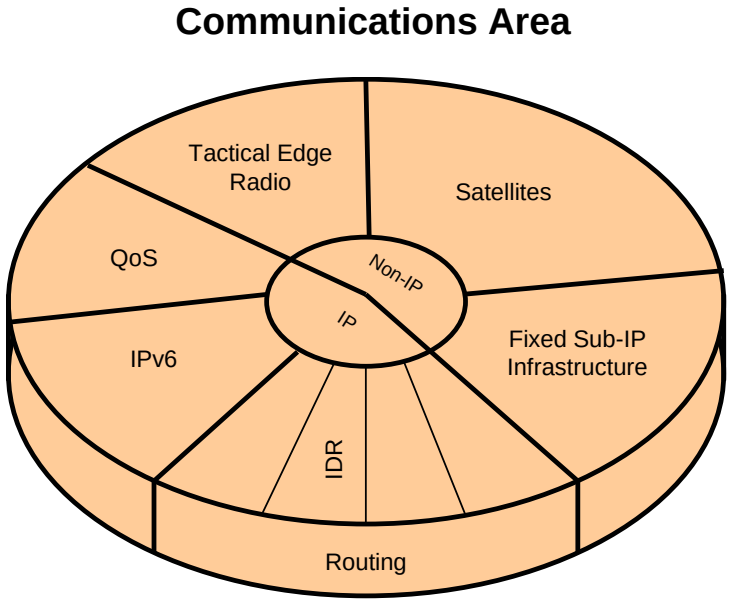
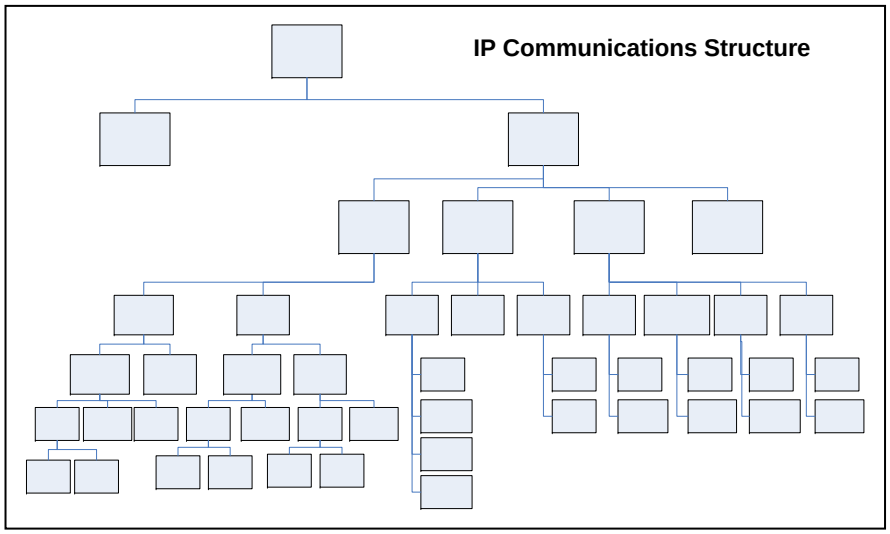
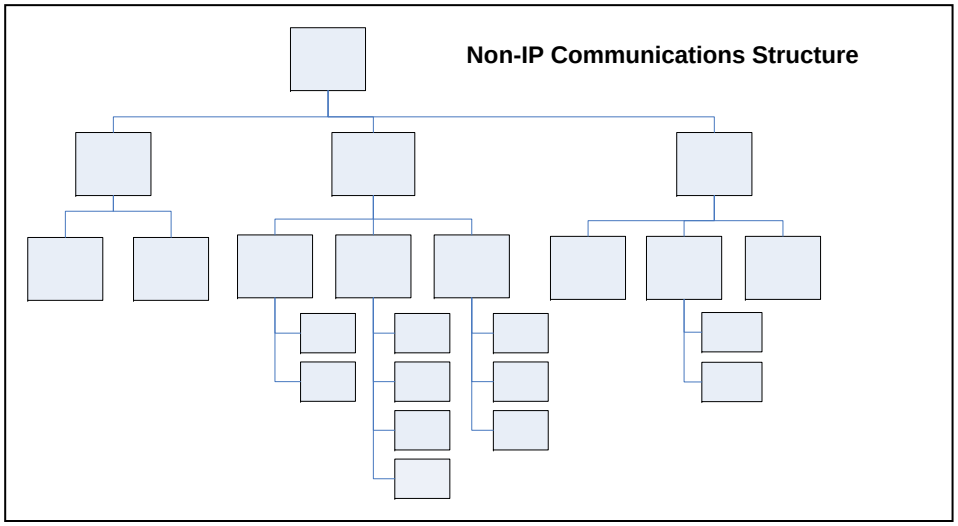
GTG Structure









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GESPs: Implementing Standards to Support NR-KPP

- **Captures the overall potential GIG value by aligning net-centric information enterprise capabilities between producer and consumer services**
- **GESPs are net-centric "recipe cards" containing:**
  - **Interoperability Requirements Description: Functional breakdown of technical features, IA/security requirements and associated best practices for implementing net-centric interoperability principles and solutions for specific GIG capabilities**
  - **Interoperability Reference Architecture: Reusable operational and system technical context views that show where GESPs fit into a program's integrated architecture**
  - **Technical Implementation Profile: DISR standards guidance citations for specific GIG service and interface options and settings required to meet NR-KPP certification requirements**
  - **Compliance Testing Information: Describes how the GESP technical implementation will be tested for compliance and identifies the location of any available test artifacts (e.g, inspection and analysis criteria, demonstration methods, or test procedures)**

Enhances the "end-user experience" and establishes a consistent basis for evaluating NR-KPP compliance

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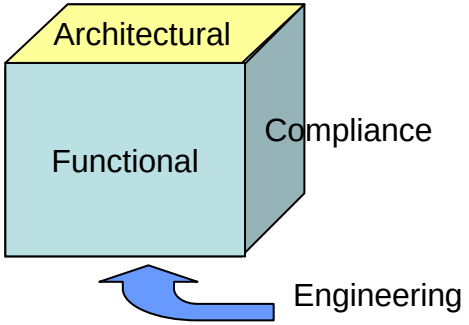
Multiple Dimensions of GESPs

- **GESPs have functional, architectural, engineering, and compliance dimensions**
- **The type of information within each dimension varies by DIEA area**



Dimension	Category	Communications Area Examples	Data Services Area Examples
Functional	Descriptions Requirements	Connections Exchanges	Delivery Discovery
Architectural	Standards Profile Reference Architecture	Interfaces Nodes	Information Content Data Artifacts
Engineering	Guidance Statements Implementations Best Practices	Waveforms Performance (e.g., BER, Latency)	Content Management Registration Orchestration
Compliance	Requirements Validation Testing & Verification	Technical Criteria against Requirements	Data Integrity Assured Service Service Efficiency

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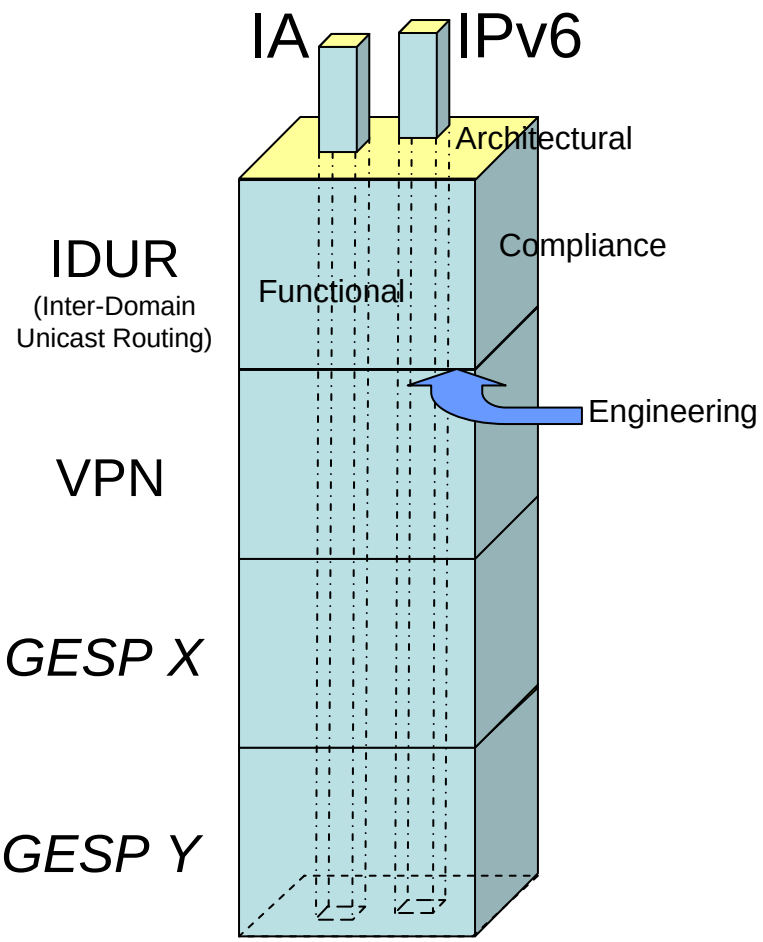
Cross-Cutting GESPs

- **Specific protocols or areas may be cross-cutting**
- **Are found in both independent GESPs and in parts of other GESPs**
- **Examples:**
  - **IPv6 has both a core GESP and has elements in other GESPs**
  - **IA (Secured Availability) Area will have independent GESPs and will be addressed in other GESPs**



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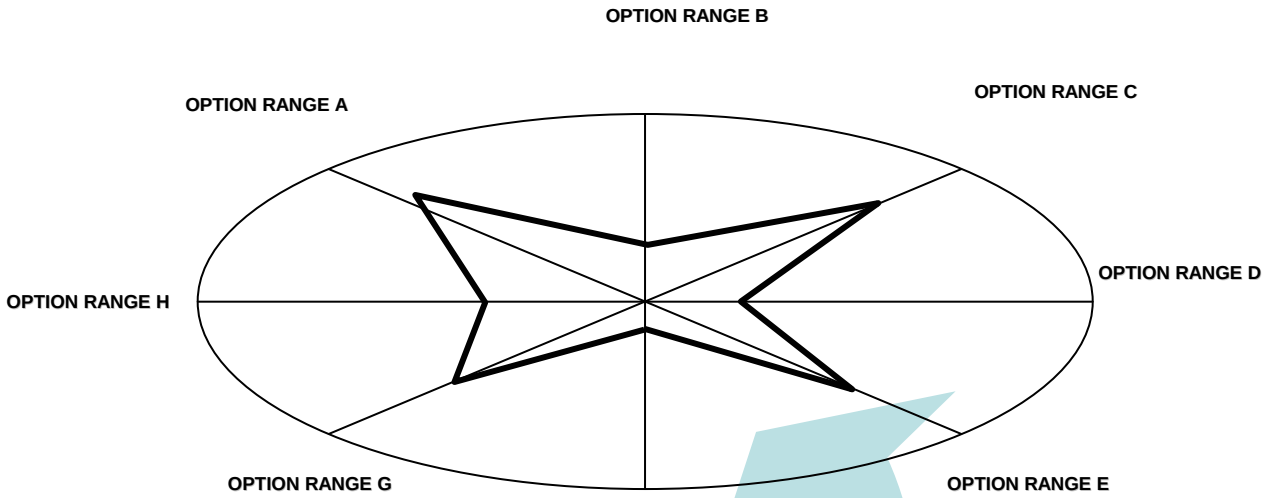
Notional GIG Profiling and Analysis Method

PROFILE

Multiple Standards



STANDARD

STANDARD OPTIONS

Analysis

Analysis Criteria:

DIEA Tenets

FEA Tenets

GIG 2.0 Tenets

SOA Model

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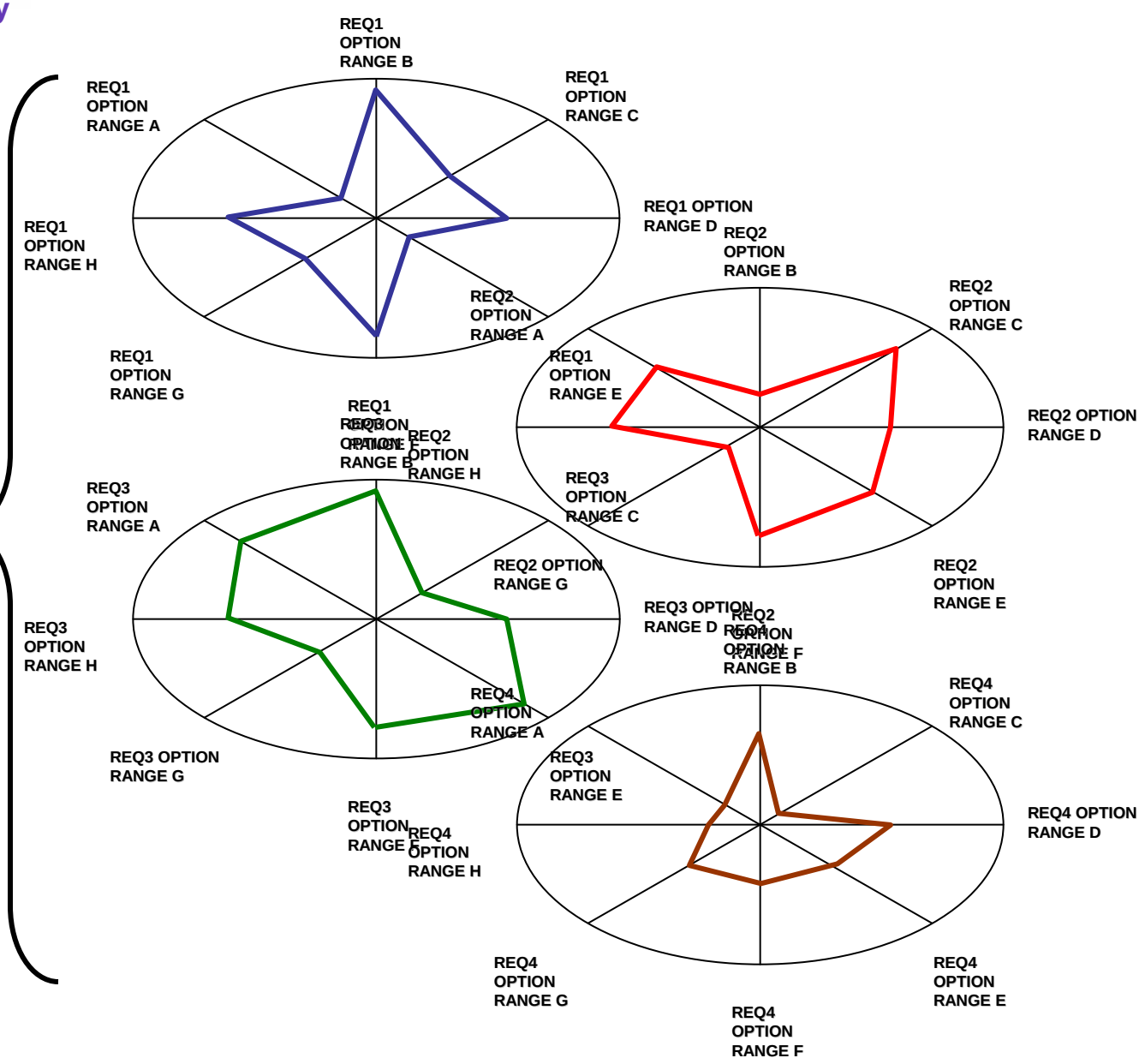
Analysis Synthesis

Analysis results for each standard are mapped across expected netcentric interoperability option ranges



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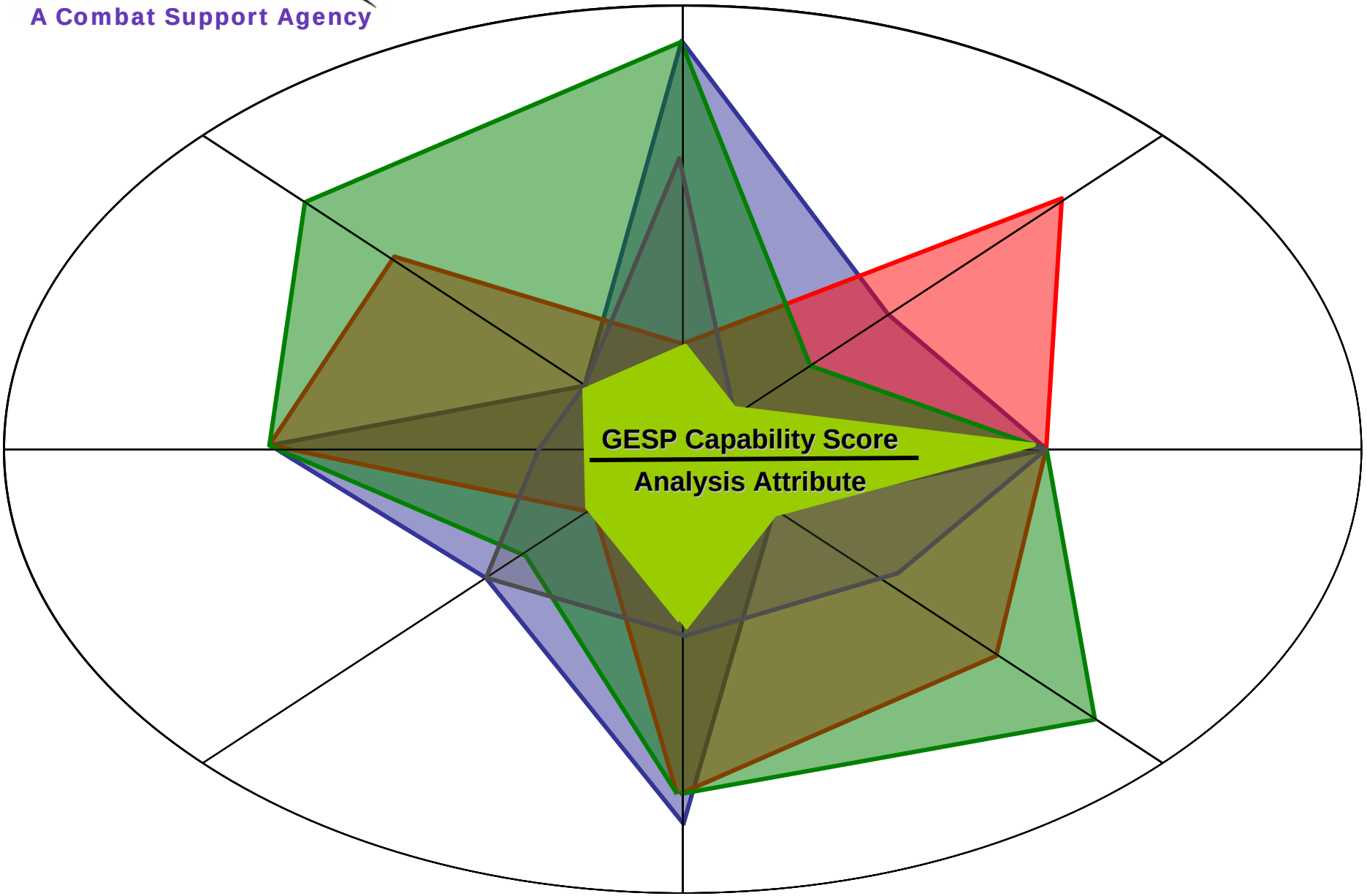
Composite Profile Measure



GTG Summary

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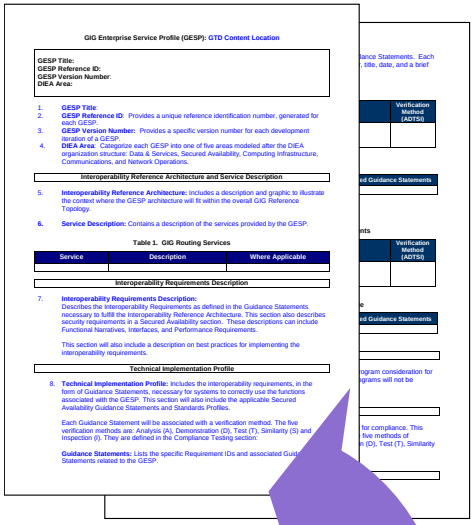
Before: Overload

After: GTG/GESP


GIG Enterprise Service Profile (GESP): GTD Content Location

GESP Title:
GESP Reference ID:
GESP Version Number:
DIEA Area:

1. GESP Title:
2. GESP Reference ID: Provides a unique reference identification number, generated for each GESP.
3. GESP Version Number: Provides a specific version number for each development iteration of a GESP.
4. DIEA Area: Categorize each GESP into one of five areas modeled after the DIEA organization structure: Data & Services, Secured Availability, Computing Infrastructure, Communications, and Network Operations.

Interoperability Reference Architecture and Service Description

5. Interoperability Reference Architecture: Includes a description and graphic to illustrate the context where the GESP architecture will fit within the overall GIG Reference Topology.
6. Service Description: Contains a description of the services provided by the GESP.

Table 1. GIG Routing Services

Service	Description	Where Applicable

Interoperability Requirements Description

7. Interoperability Requirements Description: Describes the Interoperability Requirements as defined in the Guidance Statements necessary to fulfill the Interoperability Reference Architecture. This section also describes security requirements in a Secured Availability section. These descriptions can include Functional Narratives, Interfaces, and Performance Requirements.

This section will also include a description on best practices for implementing the interoperability requirements.

Technical Implementation Profile

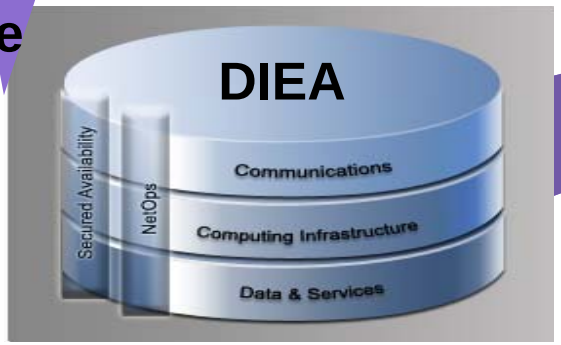
8. Technical Implementation Profile: Includes the interoperability requirements, in the form of Guidance Statements, necessary for systems to correctly use the functions associated with the GESP. This section will also include the applicable Secured Availability Guidance Statements and Standards Profiles.

Each Guidance Statement will be associated with a verification method. The five verification methods are: Analysis (A), Demonstration (D), Test (T), Similarity (S) and Inspection (I). They are defined in the Compliance Testing section:

Guidance Statements: Lists the specific Requirement IDs and associated Guid... Statements related to the GESP.

Manage and deliver evolving, actionable set of consistent technical requirements

Organize and condense disparate guidance



- **GTG Enforcement:**
  - Defines required GIG net-centric capabilities for programs to use
  - Identifies technical details for minimum consistent compliance
  - Includes the tests that verify correct implementation
  - Drives programs to use the latest GIG technology or justify why not
  - Provides metrics to gauge success
  - Leads PMs to future standards implementations that will provide trade decisions for future technology

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Backup Slides

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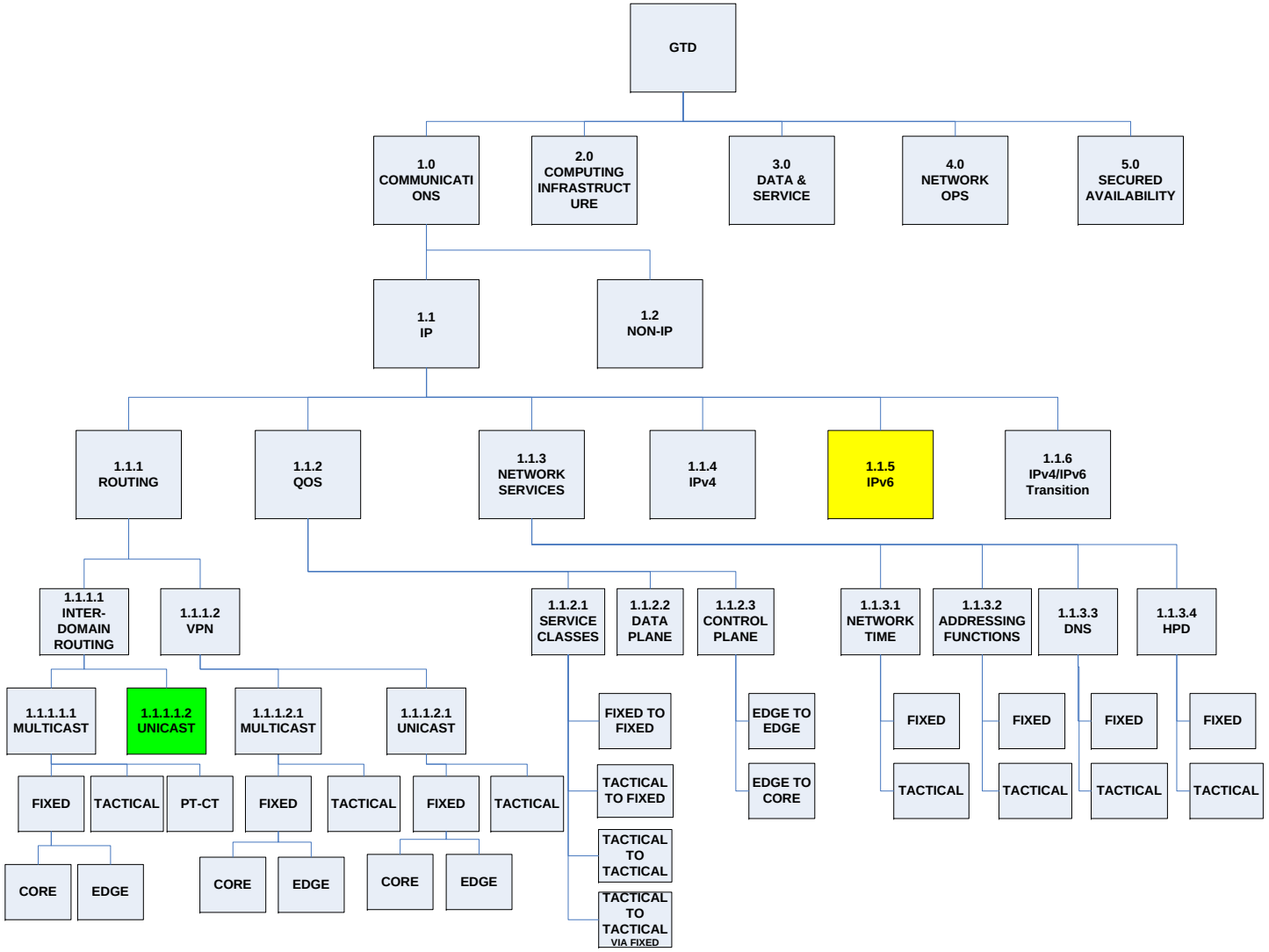
GTG Structure

- **Current GTG Structure for IP Communications**



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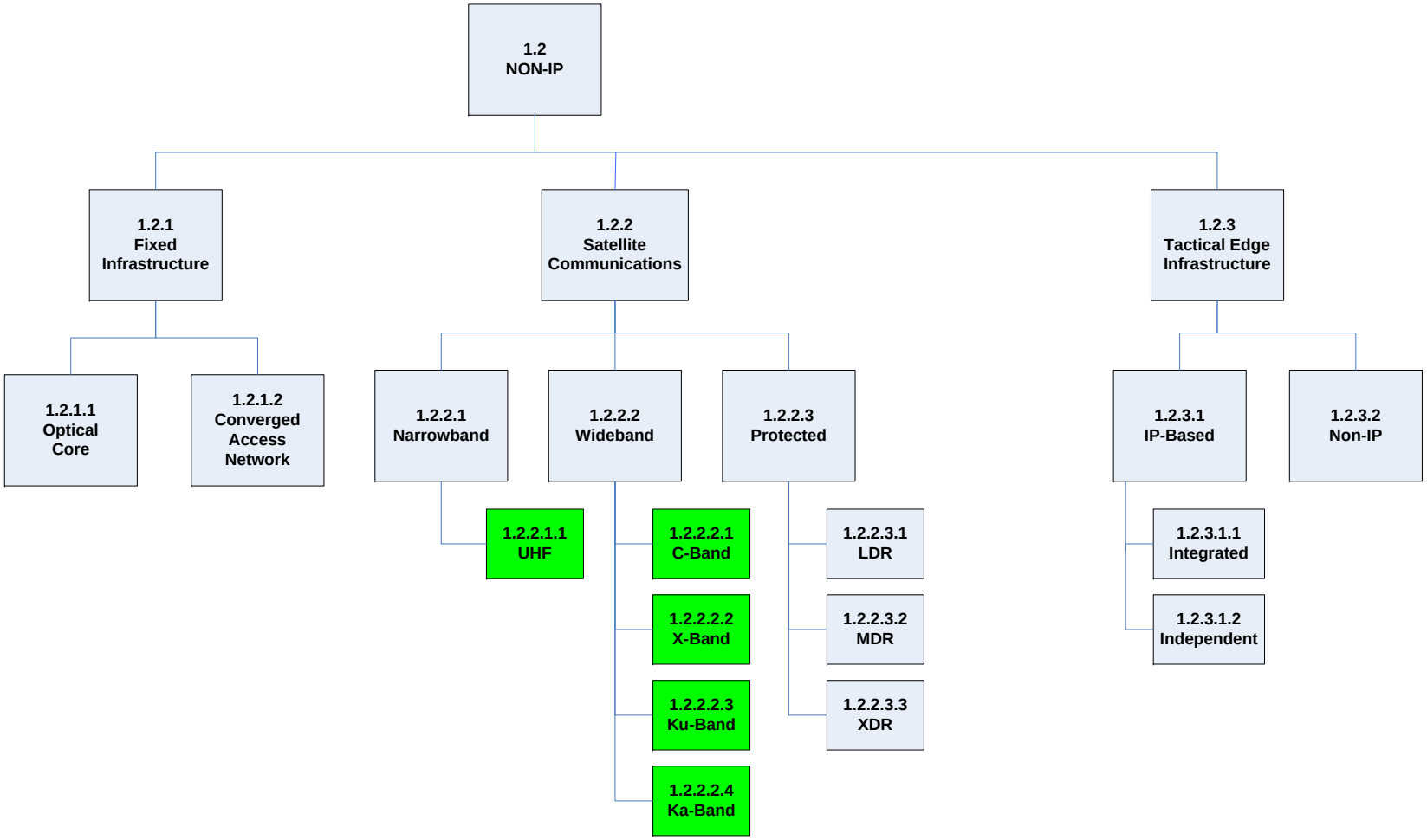
GTG Structure

- **Current GTG Structure for Non-IP Communications**



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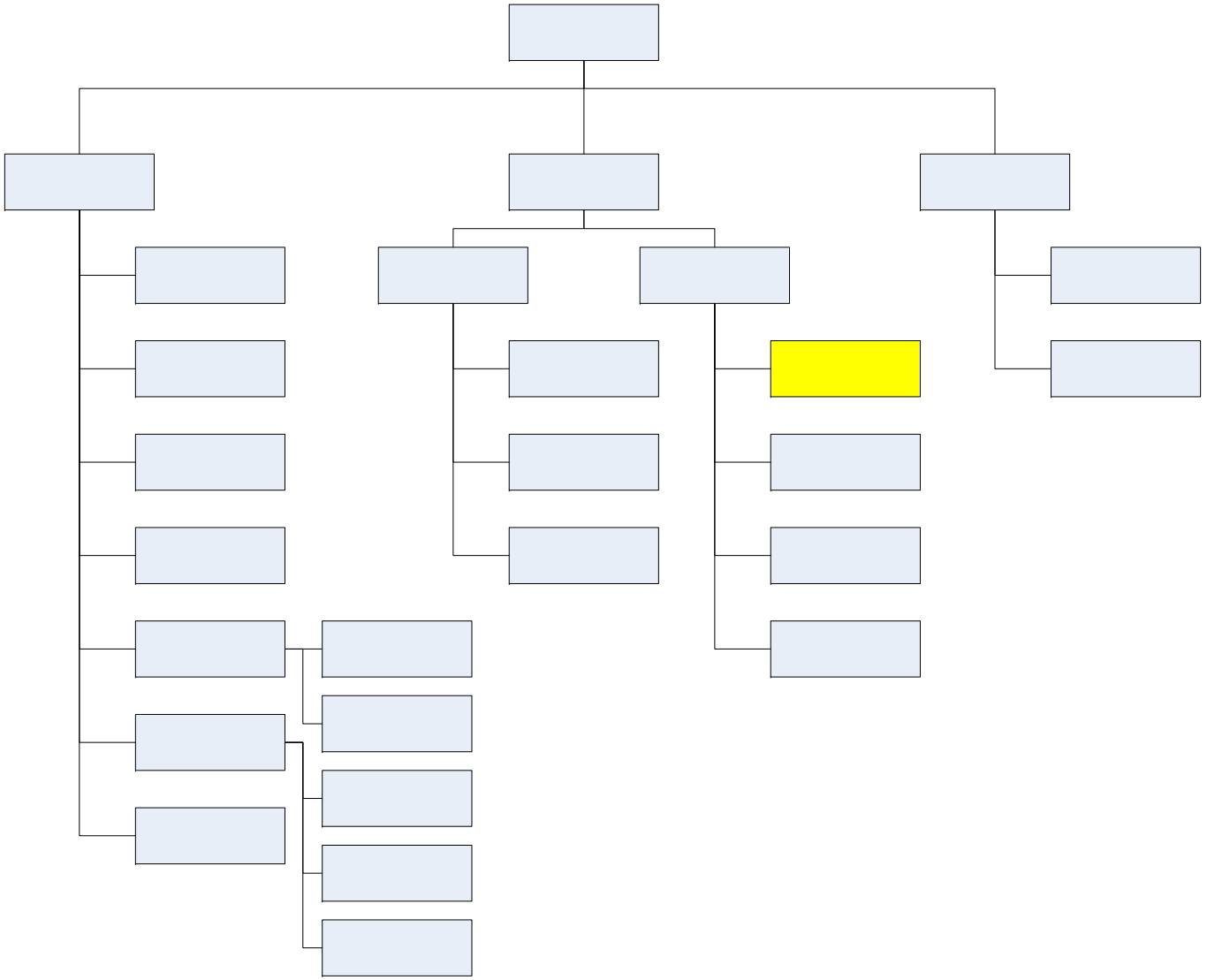
GTG Structure

- **Current GTG Structure for Data & Services**



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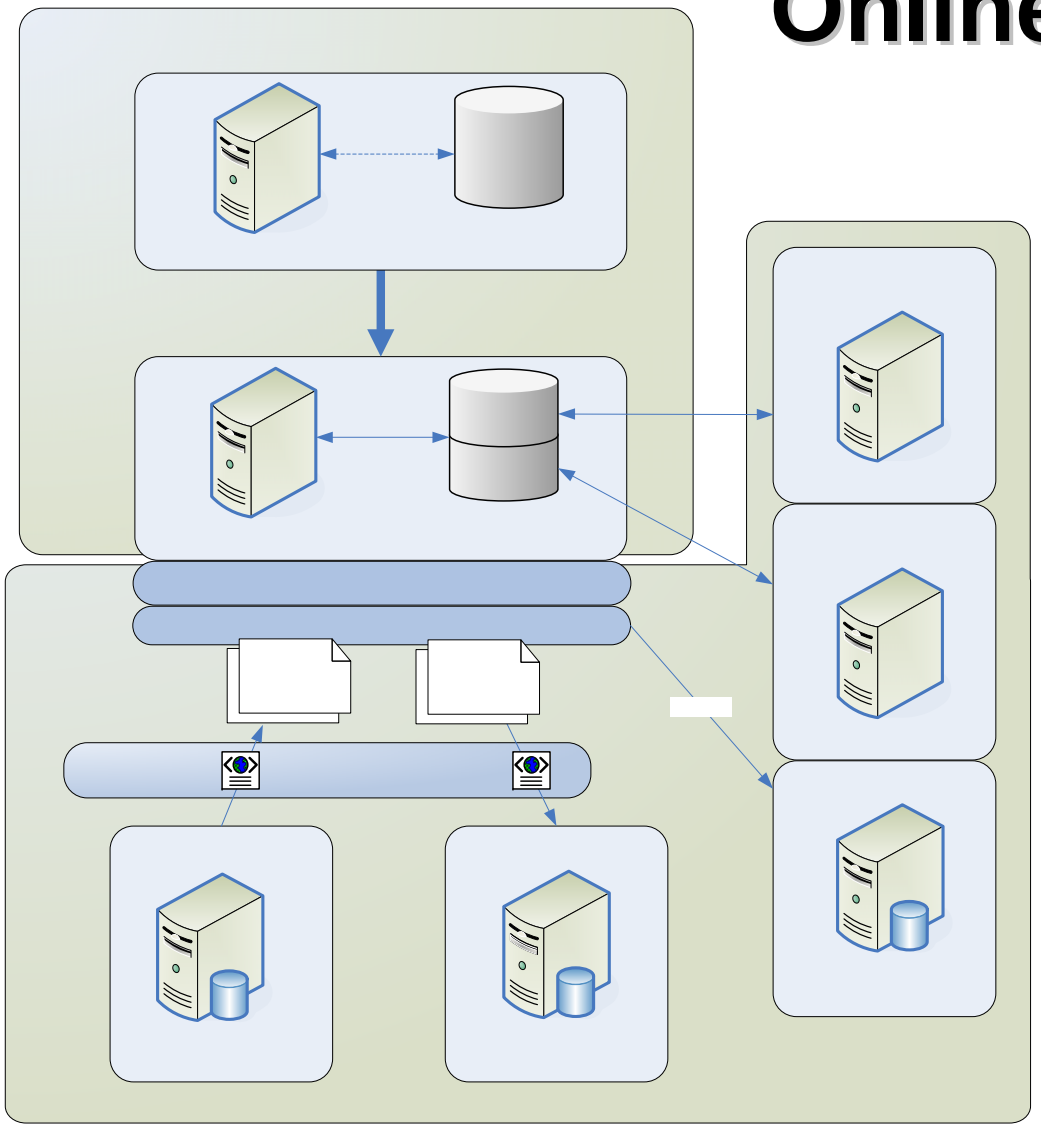
Near-Term Tool Federation for NR KPP Assessment (GTG Online)

- Phase 1 – Adopt and Extend: Status - Complete
  - ☑ Adopt NII GICA model
  - ☑ Extend GICA prototype to create viable user GTG Online system
- Phase 2 – Align and Interface: Status – 80% Complete
  - ☑ DISR/GESP Standards web service
  - ☑ Register preliminary GPML (GIG Profile Markup Language)
  - – Consume DISR questionnaire
  - – Align ISP data with GTG
  - – Package GTG and ISP content for assessment



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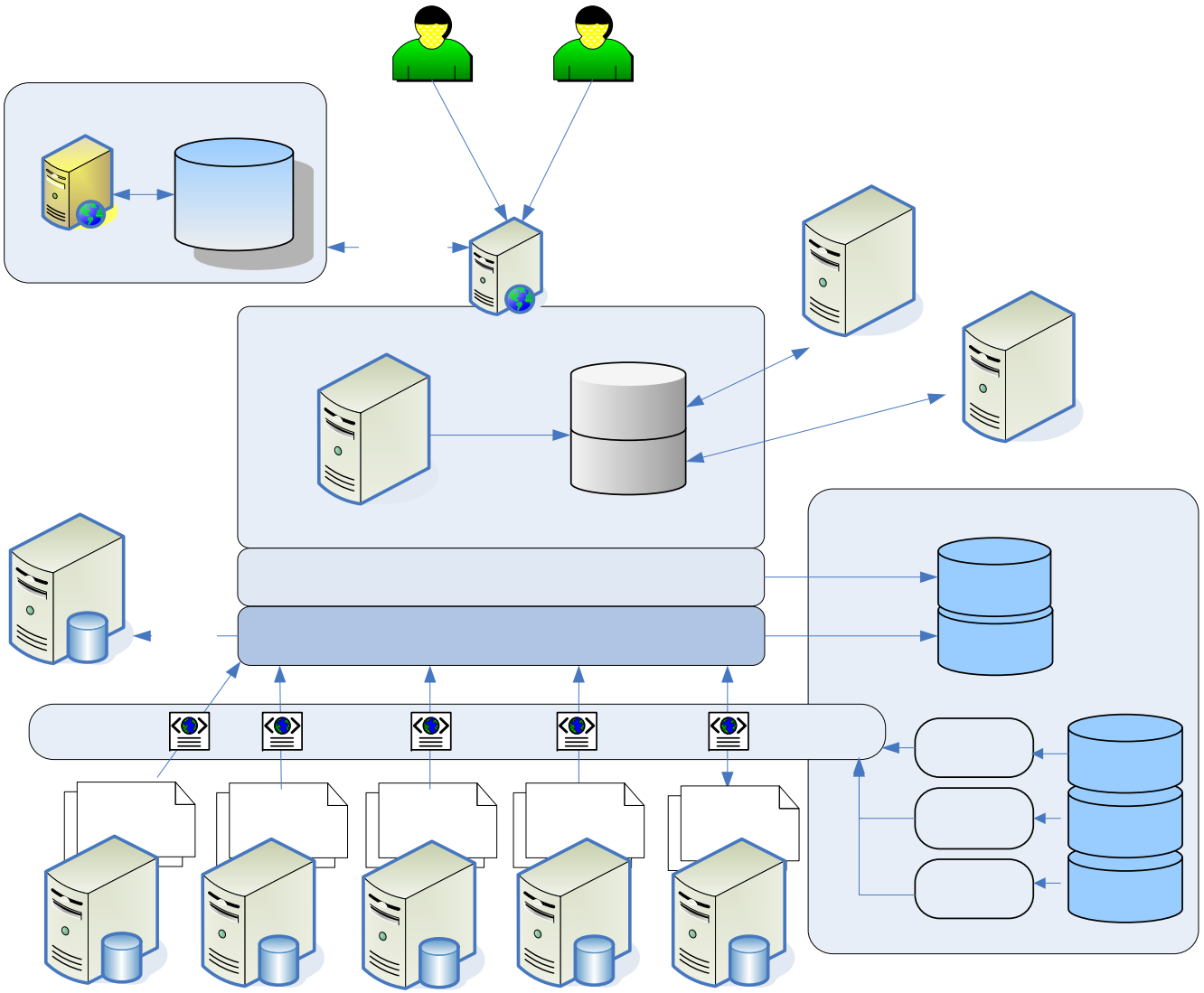
Far-Term Federated Architecture for NR KPP Assessment

- Phase 3 - Federate
  - C&A
  - Hosted in DECC
  - Integrate with Single Sign-On
  - Register with NCES Service Registry and Content Discovery
  - Extend common language (GIG Profile Markup Language (GPML))
  - Integrate with NCES security Services
  - Integrate with JCIDS repository and Architecture repository (DARS)



Program Activity Diagram

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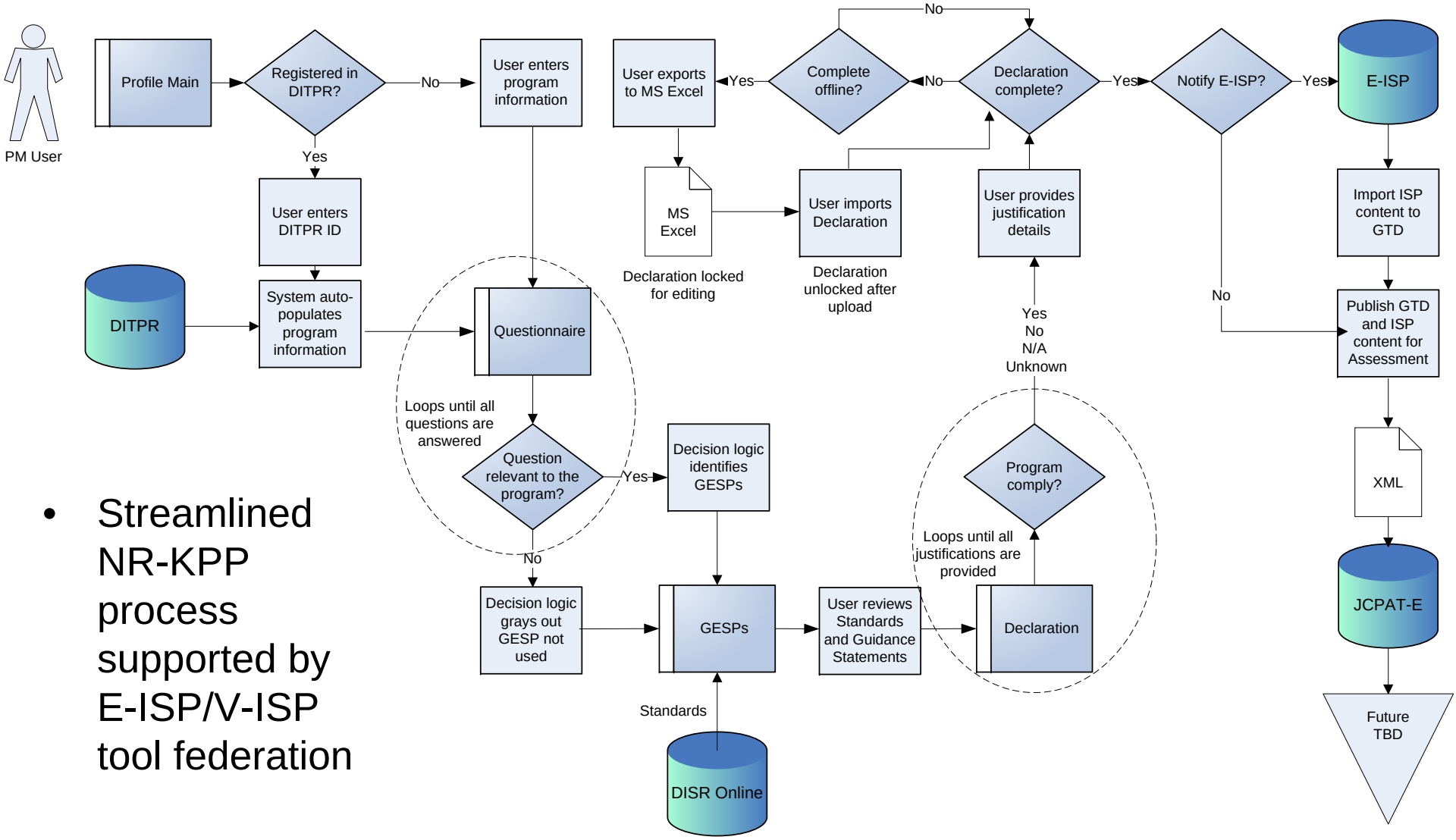

- Streamlined NR-KPP process supported by E-ISP/V-ISP tool federation

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GTG Links and PoCs

- Joint Staff 6212 GTG Wiki Page:
  - https://www.intelink.gov/wiki/Portal_Talk:CJCSI_6212_Revision
- GTG Online:
  - http://216.181.4.90/gtddemo/start.do
- GIG Enterprise Service Profile Documents:
  - https://www.intelink.gov/inteldocs/browse.php?fFolderId=14595
- GIG Technical Guidance Lead/CM Board Chair:
  - Mr. Dave Brown, dave.brown@disa.mil, 703-681-2556
- GIG Enterprise Service Profile (GESP) Development Groups Lead:
  - Mr. William Wong, william.wong@disa.mil, 703-681-2631
- EWSE GESP Development Lead:
  - Mr. Yong Xue, yong.xue@disa.mil, 703-681-2005
- GTG Management Support:
  - Ms. Lylha Cahill, Booz Allen Hamilton, cahill_lylha@bah.com, 703-377-4862


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