CASCADE

Joint Cyber Sensor Architecture

[redacted]

Overview

- Project Overview
- Current Status
- Proposed Architecture
- Towards 2015

Project Overview

- Alignment of passive cyber sensor capabilities and architecture in the SIGINT and ITS missions
- Goals
  - Common sensor technology and architecture
  - Address scalability issues in sensor deployments
- Scope
  - Passive sensors and supporting infrastructure are in scope
  - Analytic tools are out of scope
  - Host based capability is out of scope (caveat: passive messaging is in scope)

Our Sensors

SIGINT / ITS

Photonic Prism

- Monitoring of GC Networks
- Includes:
  - Full-Take Packet Capture
  - Signature Based Detection
  - Anomaly Based Discovery
  - Analytic Environment
  - Oversight Compliance Tools

EONBLUE

- Monitoring in Passive SIGINT
- Includes:
  - Full-Take (on specific accesses)
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- Additional Functions are offloaded and exist further downstream:
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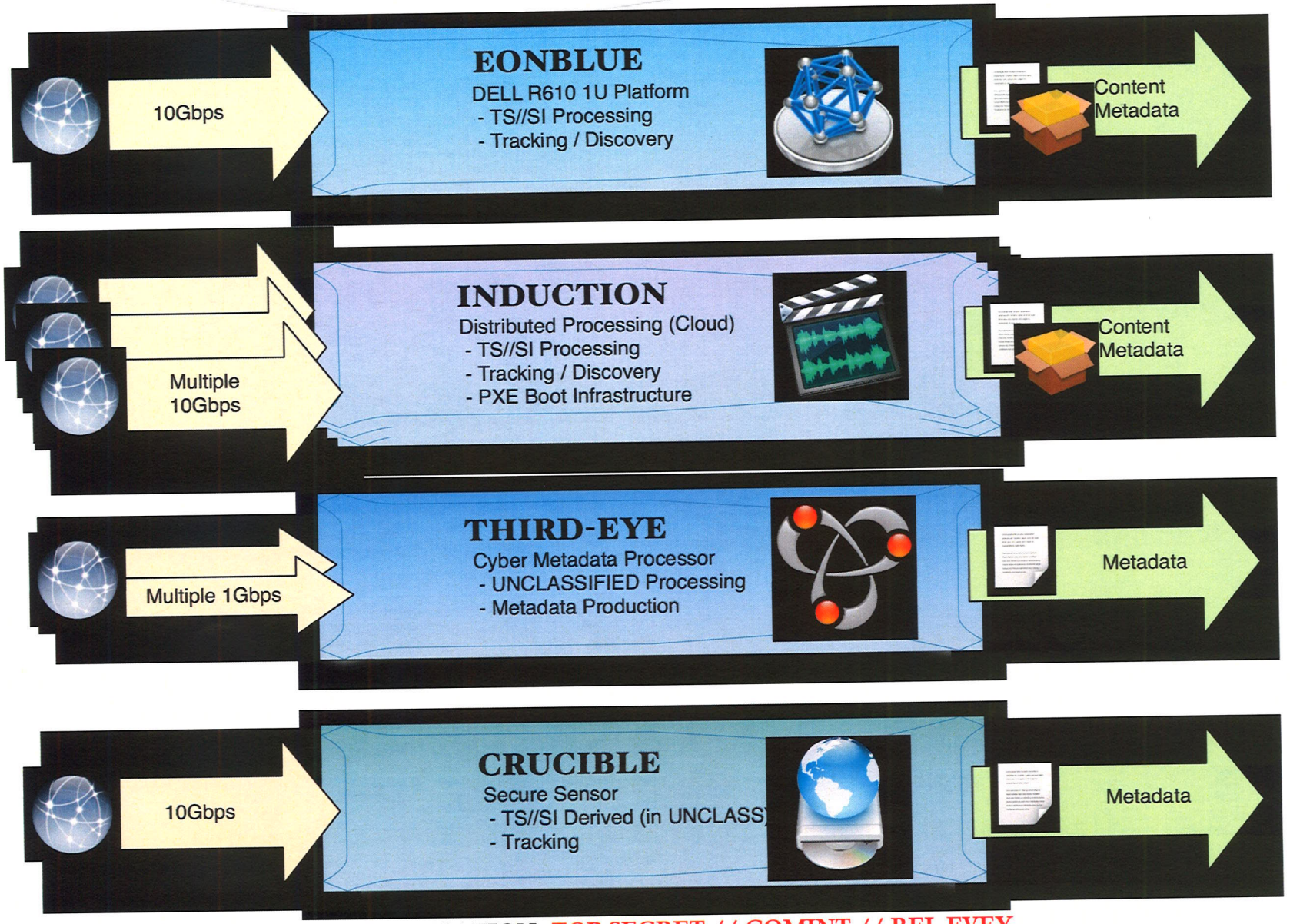
Shades of Blue



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  - THIRD-EYE metadata production at select new sites
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Divergence – Sensor Deployments

- While both ITS/SIGINT currently leverage EONBLUE software:
  - The architectures are not aligned
  - Configuration differs greatly
  - Software versions are not standard across programs
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Problem Statement

- Divergence
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  - Within each area, versions are not standardized
- Management and Scalability
  - Some configurations will not scale
  - Difficult to manage current sensor environment
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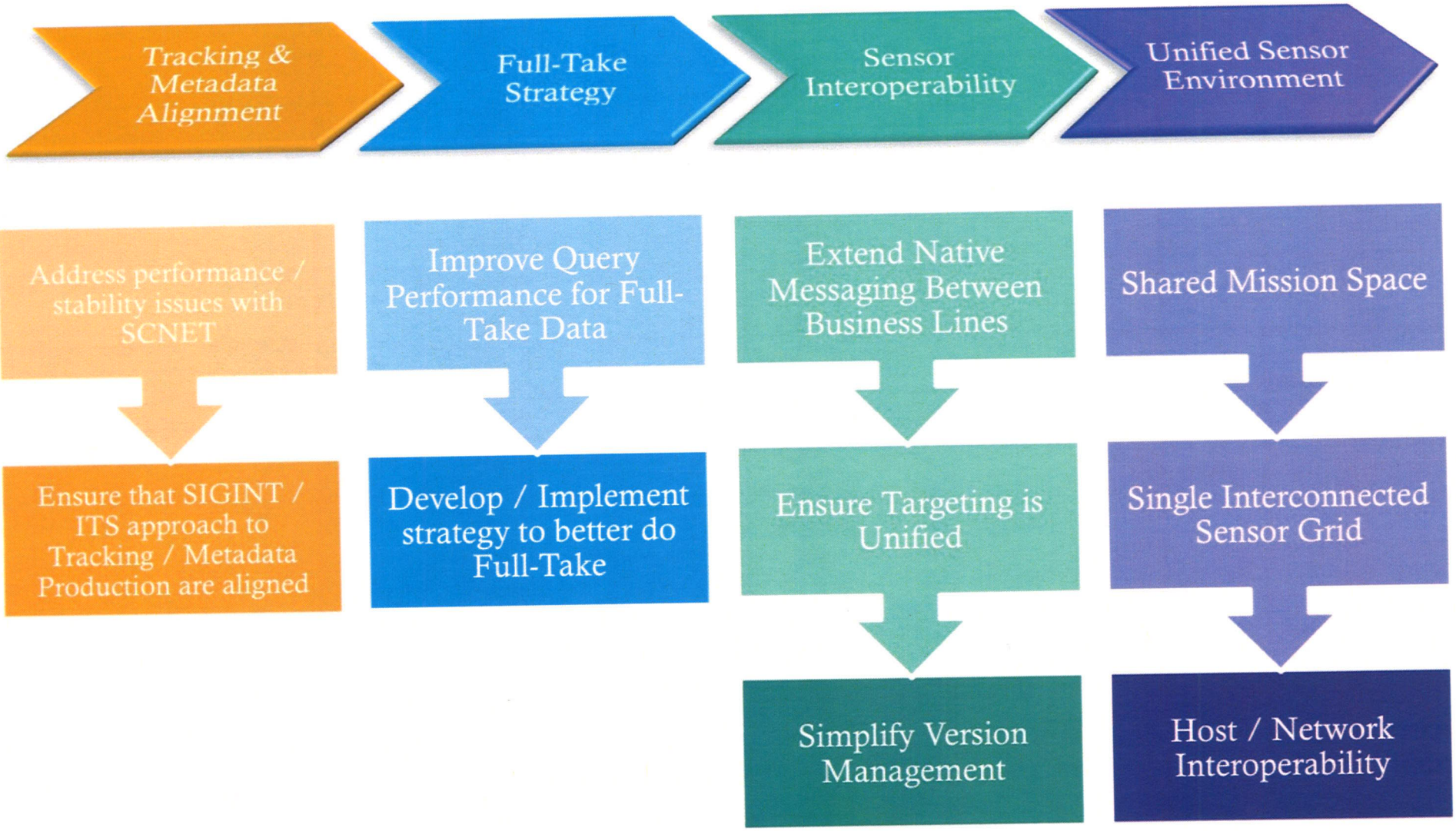

Tracking and Metadata

Ensure EONBLUE is deployed in a standard fashion across all environments

- Upgrade SCNET to 10Gbps EONBLUE
- Update all SIGINT collection sites to latest code release

Produce Standard Metadata

- DNS Response Harvesting
- HTTP Client / Server Headers
- IP-to-IP Flow Summarizations

Full-Take Strategy

Address SCNET Scalability

Reconfiguration / Design of Storage Solution	Improved / Enforced data indexing and quering

Leverage Third-Eye Architecture

Distributed Collection Grid (at multiple clients)	Queries are Federated and Centrally Managed	Enables unique data ingest at client department (i.e. Firewall Logs)

Full-Take Strategy

- Benefits
  - Improve Performance
    - Better data indexing techniques
    - Federated queries across multiple systems
  - Reduced Cost (Storage local to client departments)
    - 10,000$ -> 25,000$ per client
    - Re-use of back-end Storage
  - Enable departmental security officers / operators
    - Capability of Third-Eye exceeds what is commercially available
- Cons
  - Requires network connections to each GC Department
  - Requires footprint within each departments datacenter
  - Complexity of distributed processing

Sensor Interoperability

EONBLUE sensors exchange messages to enable more robust selection and filtering

- Messages should be automatically exchanged between SIGINT and ITS/CTEC
- The sensor environment will be connected to enable seamless message flows

Targeting selectors for Cyber Threats will be unified

- When updates are made to SIGINT sensors the selectors will be automatically replicated for ITS
- JAZZFLUTE should support ITS analysts targeting SIGINT systems

Simplify Sensor Version Management

- Rapid deployment of new capability seamless across all programs / sites
- Distributed Induction (Across WAN)
- EBSH: Sensor has custom CLI like a switch and supports inline binary updates

Interoperability enables Synchronization

- ITS access to data collected by SIGINT sensors
  - Outputs should be common to enable a common analyst platform
  - Sensor environment should be seamlessly integrated
- Capability remains at cutting-edge
  - Single release for all collection programs in SIGINT, all points of presence, and across both missions
  - Management is simplified for operators, focusing on sensor expansions
  - Standardized OS Versions and Optimizations

Unified Sensor Environment

All Cyber Sensors form a complete eco-system

- Access point is Mandate / Authority Agnostic
- Sensors are Multi-Modal (Defence or Intelligence from any sensor, anytime)

Extend Messaging to Host Based Capabilities

- IT Security Host Based Agents
- CNE implants

Cyber Processing and analytic environments converge

Two-Tier Environment

- Automated / GUI rich environment for operators
- Command-Line Driven RAW access for Discovery

Shared Network Resources for Common Services

- Wiki / Blog / Chat
- NIS / NTP / DNS / Messaging / etc

Synchronized Deployment Strategy

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- Coverage-based deployment considerations – what are the gaps?
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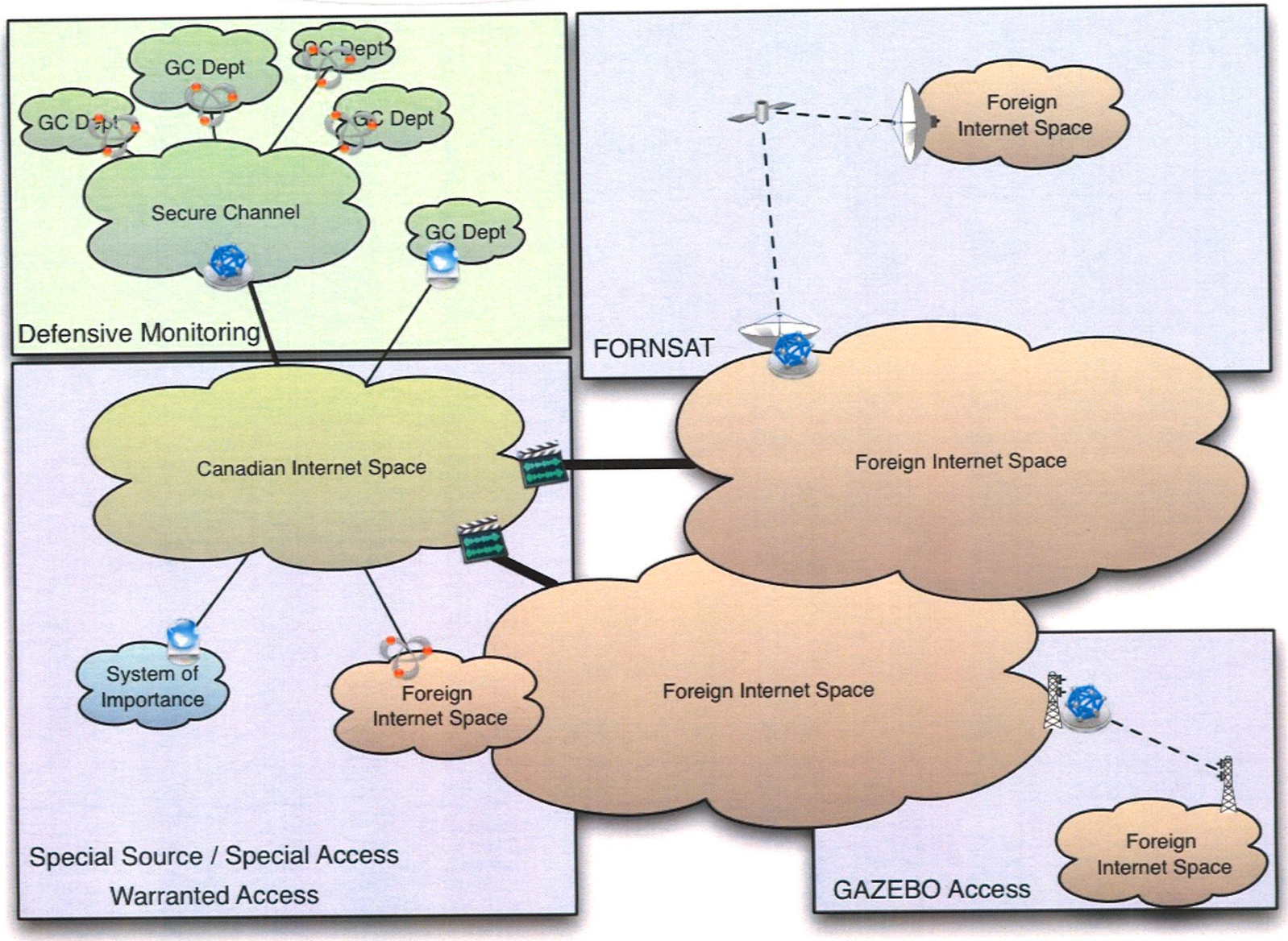
Canadian Cyber Sensor Grid



Towards 2015

Beyond sensor unification

CSEC 2015

- Strategic Priorities for CSEC
  - Strengthen "Team CSEC" and Prepare for Our New Facility
  - Adopt Innovative and Agile Business Solutions
  - **Expand Our Access Footprint**
  - **Improve Analytic Tradecraft**
  - Automate Manual Processes
  - **Synchronize the Cryptologic Enterprise for Cyber Security Mission**
  - **Enable "Effects" for Threat Mitigation**

Cyber Sensor in 2015

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  - We will increase operational capacity by ensuring SIGINT, ITS, and cryptologic partner sensors interoperate seamlessly.
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  - We will seek the authority to conduct a wide spectrum of Effects operations in support of our mandates.
  - We will build the technical infrastructure, policy architecture and tradecraft necessary to conduct Effects operations.
  - We will further integrate ITS and SIGINT authorities and operations to leverage common sensors, systems and capabilities necessary for active and expanded dynamic cyber defence measures.

The Network Is The Sensor

Principles

- Security needs to be transparent to the user in order to be effective
- Security is a right for all Canadians
  - Federal Government
  - Municipal / Provincial Gov
  - Critical Infrastructure
  - Industry
  - The Citizen
- End-Users should incur little cost for security
- IT Assets should be distributed
- Access is mandate / authority agnostic

Goals

- Detect threats as they enter our national networks, not at the Gateway
- Identify Exfiltration, Command and Control, anywhere in our national networks
- The network is your defence for all infrastructure

Rationale

- We can't keep pace with our adversary
- Gateway / Device / End-Node protection is not sufficient (essential, yes)
- Rather than plugging one hole at a time, build better layered defence

Principles Explained

- Security is Transparent
  - If security inhibits functionality, or interferes with user experience it will be bypassed
- Security is a right
  - Attempting to protect everybody with end-node / gateway defenses is not feasible.
- IT Assets should be distributed
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Rationale

- Keeping pace with the Adversary
  - From the time a malicious PDF is opened, till SEEDSPHERE has interactive control of a workstation is <3 minutes
  - There are countless malicious actors (state, crime, generic malware)
- Gateway / End-Node Defence by itself is insufficient
  - It is only one part of the problem
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  - Defence in Depth includes network monitoring, and network interaction
- Build better Defence
  - Our current MO is to resolve one incident at a time
  - Automate the defence through a robust network capable of not only detection, but manipulation of malicious traffic

What does it Mean?

- EONBLUE will be integrated into the Network
  - Monitoring Government of Canada
  - Monitoring Core Infrastructure (Special Source) extending the reach to view national infrastructure
  - Monitoring foreign Internet Space
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  - Through robust communication with host-based capabilities
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Food for Thought

Changing the way we think

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  - Becomes the 'hunting ground' for discovery of new threats
  - Enables attribution and counter-intelligence reporting
  - Defence is taken care of by 'The Network'
  - Mobile Platforms are the next frontier, what is their implication on Cyber?
- Domestic Defence
  - We will exhaust the treasury deploying network appliances to perform dynamic defence
  - The same capabilities will be integrated into the CORE of the Internet
  - Defence in Depth through complimentary capabilities on end-nodes, at the gateway, and in the core of the Internet.

Conclusion

- CASCADE
  - The harmonization of ITS/SIGINT Sensor capabilities
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- Towards 2015
  - The Network is the Sensor
    - Defence, Mitigation, Intelligence all formed from a single comprehensive network creating a perimeter around Canada
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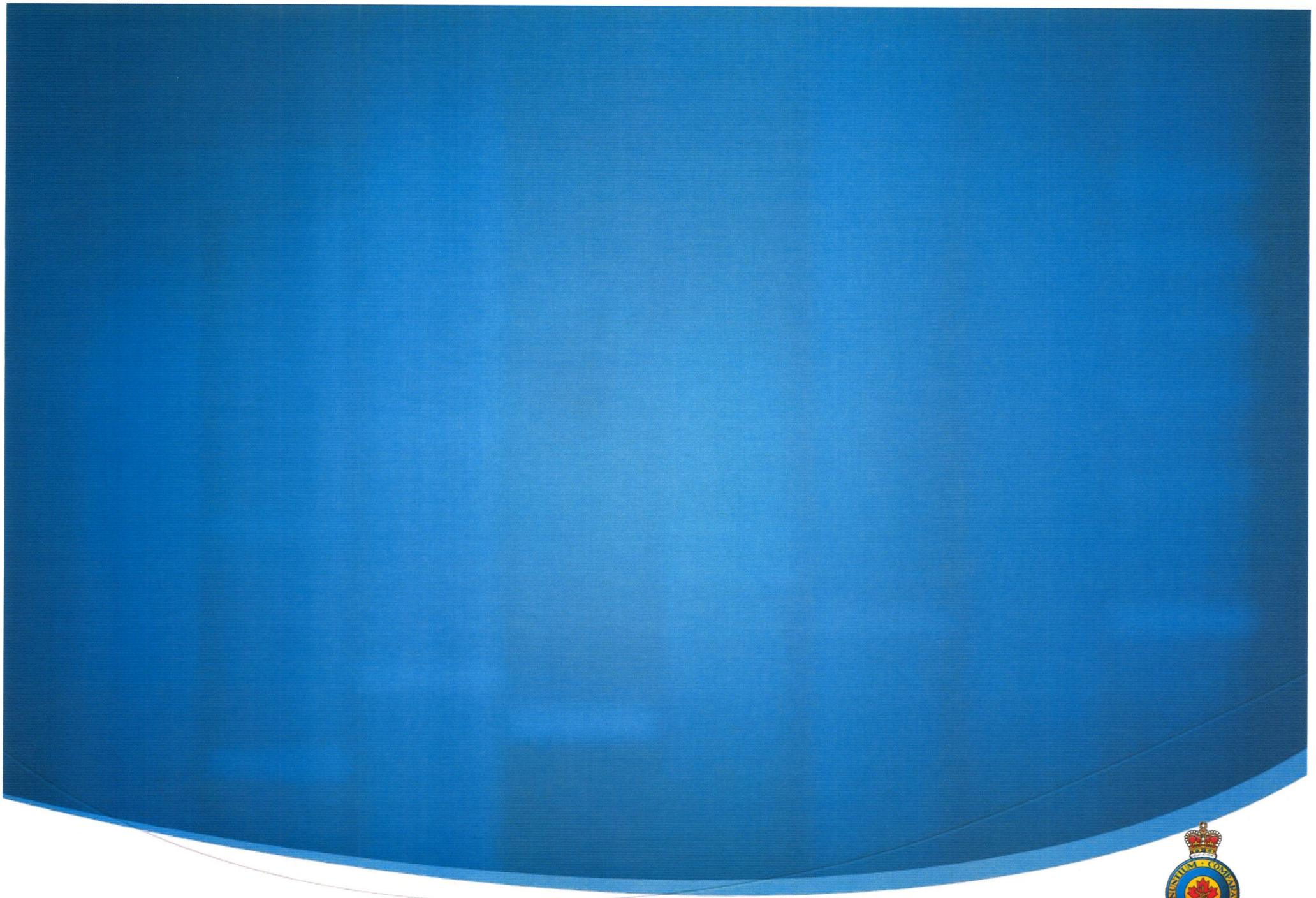

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What is the project about?
Define the goal of this project
Is it similar to projects in the past or is it a new effort?
Define the scope of this project
Is it an independent project or is it related to other projects?

* Note that this slide is not necessary for weekly status meetings

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SIGINT / ITS

CLASSIFICATION: TOP SECRET // COMINT // REL FVEY

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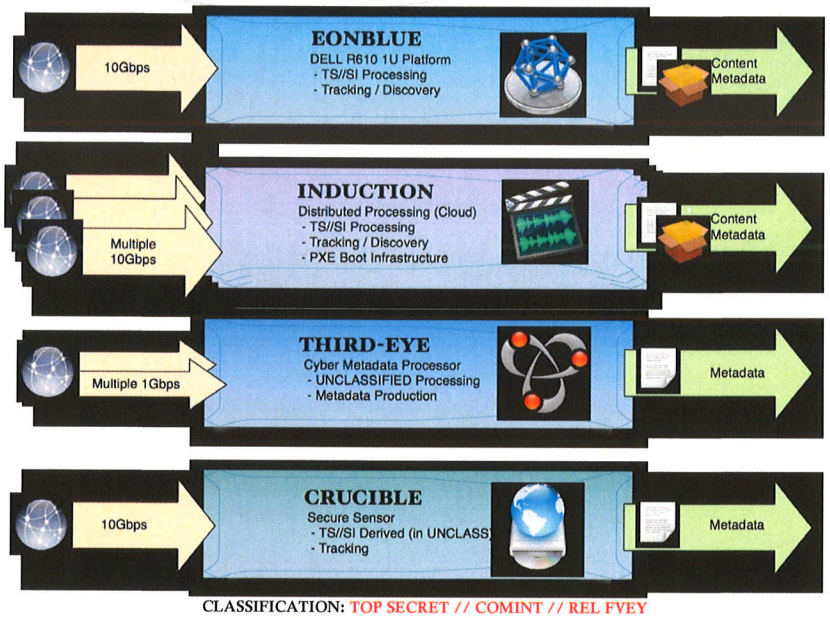

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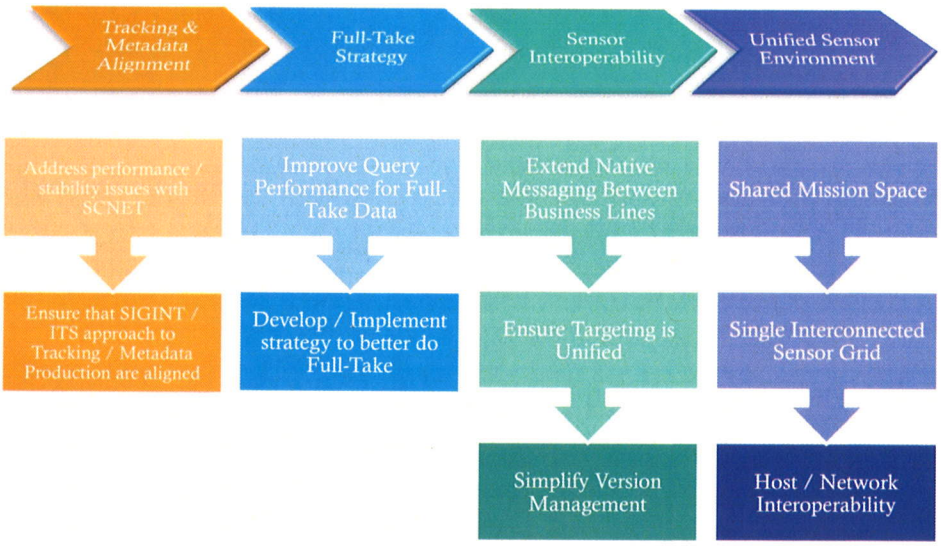

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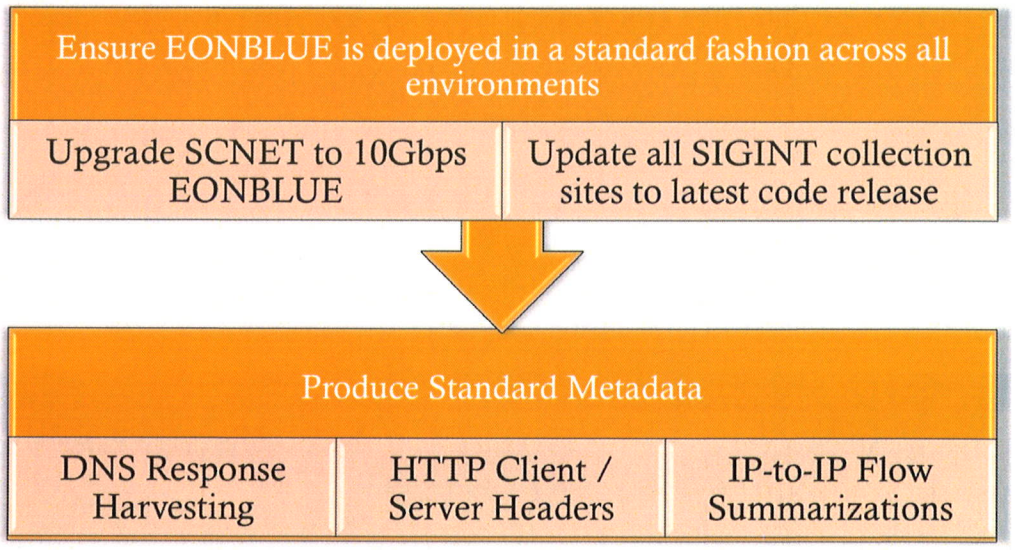

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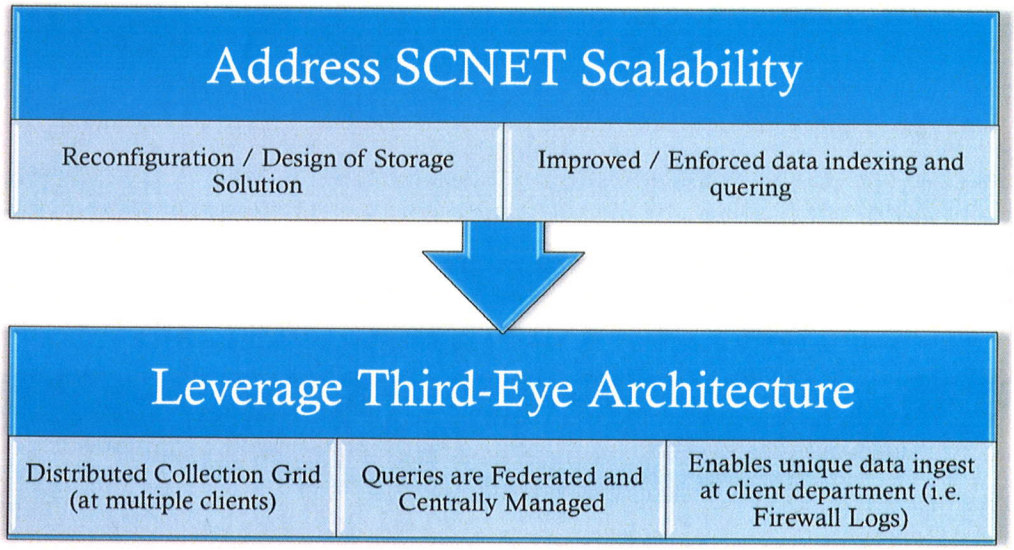

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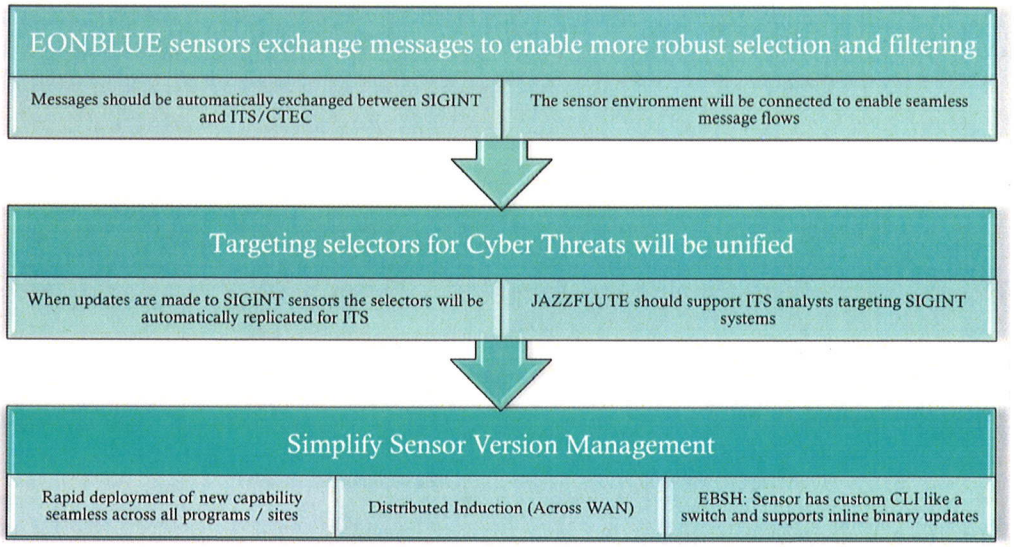

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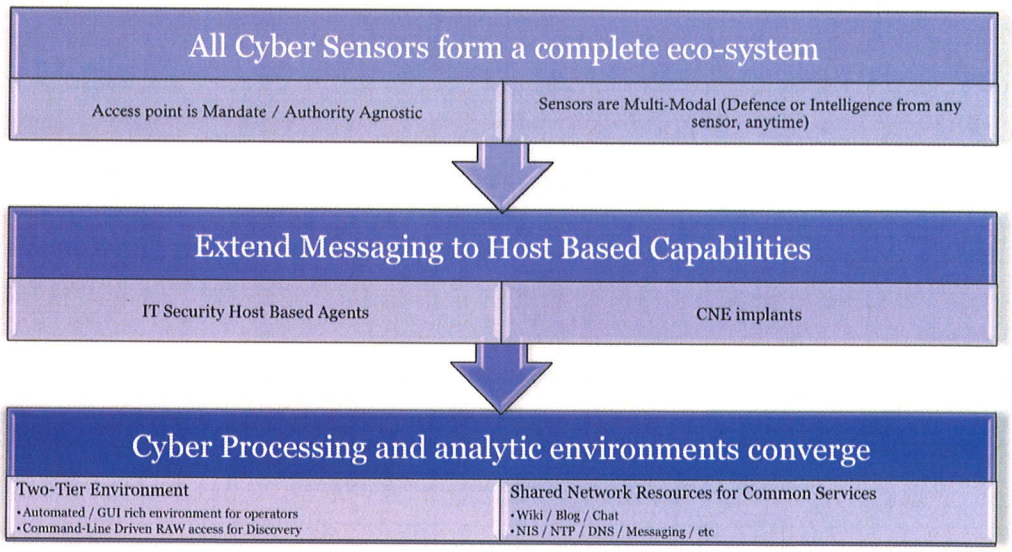

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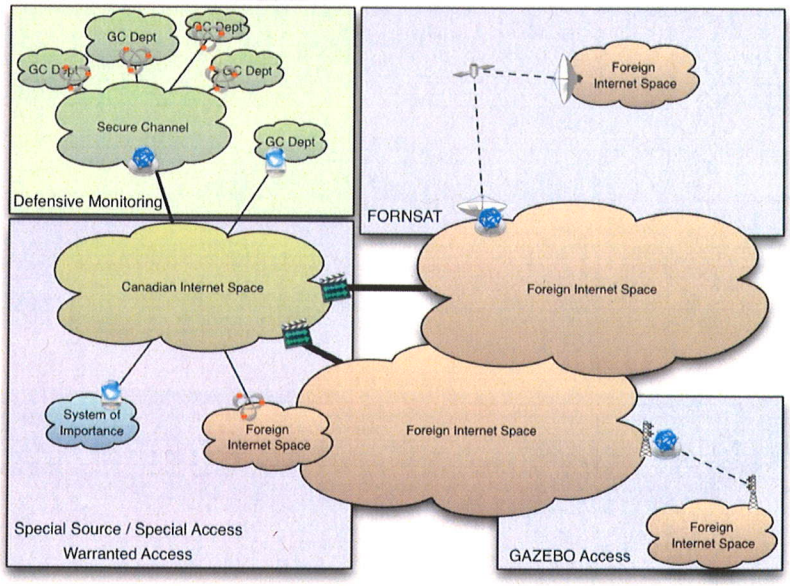

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