Interoperable Architecture for Command and Control

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1. **Introduction**
2. Common architecture development approach
3. Common Information Exchange Architecture
4. CIEA concept experimentation
5. CIEA experiment results
6. Data Link Processor concept
Introduction

Traditional Engineering Approaches
Common Architecture Development Approach

- Defence Forces forced to re-think systems development
- Move towards common building blocks emerging
- Building blocks are expected to conform to a common architecture
- Common Information Exchange Architecture (CIEA) could expedite the integration of systems
Common Information Exchange Architecture

CIEA must address:

Interoperability : Flexibility : Shorten Acquisition Time

Data States
Data-in-Use
Data-in-Rest
Data-in-Motion

Communications
Combat communications bus
- clever routing
Static communications bus

Common Information Model
Object-orientated (inheritance)
Resource Description Framework
Standard Information Formats
Tags for semantic meaning
Common Information Exchange Architecture

Platform/C2 System/Sensor Combat Group A

App A
DM

App B
DM

Tactical/Mobile Communication Infrastructure

Combat Communications Bus

Platform/C2 System/Sensor Combat Group B

App C
DM

App D
DM

Tactical/Mobile Communication Infrastructure

Combat Communications Bus

Static Communications Bus

Static Communication Infrastructure

DM
App E

Data-in-Rest Gateway

DM

Data Servers
Databases
Archives

DM - Data Model
App - Application
Common Information Exchange Architecture: Experiment

Gateway experimental set-up

Comparative CIEA

Gateway experimental implementation to validate the CIEA
Generic Publish-Subscribe Time-stepped Middleware
(A C++ Layered Distributed Architecture Developed by DPSS)

Object Oriented Datamodel
- based on LinkZA
- consistent units
- consistent conventions
- extendable
- supports Legacy systems
- supports Non-LinkZA systems
- supports M&S

Common Information Exchange Architecture:
Experiment
Static site 
Data-in-rest server systems 
such as email servers, 
document servers and data 
servers
Combat Group C
Temporary Tactical Headquarter with 
data-at-rest client and C2 data-in-
motion applications utilising only 
satellite connectivity

Combat Group A
Tactical data-at-rest client with 
numerous data-in-motion 
applications utilising different 
connectivity mediums

Combat Group B
Tactical data-at-rest client with 
numerous data-in-motion 
applications utilising different 
connectivity mediums

Common Information Exchange Architecture: 
Experiment

140km
190 km
480km
670km
Common Information Exchange Architecture: Experiment
Common-Data Model Enables
- Integration of Data-in-Motion sources
- Integrations of legacy systems via gateway
- Flexibility
- Data Filtering Enabled
- Decision rules can be applied
Common Information Exchange Architecture

Platform/C2 System/Sensor
- Combat Group A
  - App A
    - DLP
  - App B
    - DLP
- Combat Communications Bus

Platform/C2 System/Sensor
- Combat Group B
  - App C
    - DLP
  - App D
    - DLP
- Combat Communications Bus

Static Communications Bus

Tactical/Mobile Communication Infrastructure

Data-in-Rest Gateway

Data Servers
Databases
Archives

DM - Data Model
App - Application
Thank you