PARSONS

BRIDGING THE VOID

NEXT GEN CDS FOR SPACE SYSTEMS

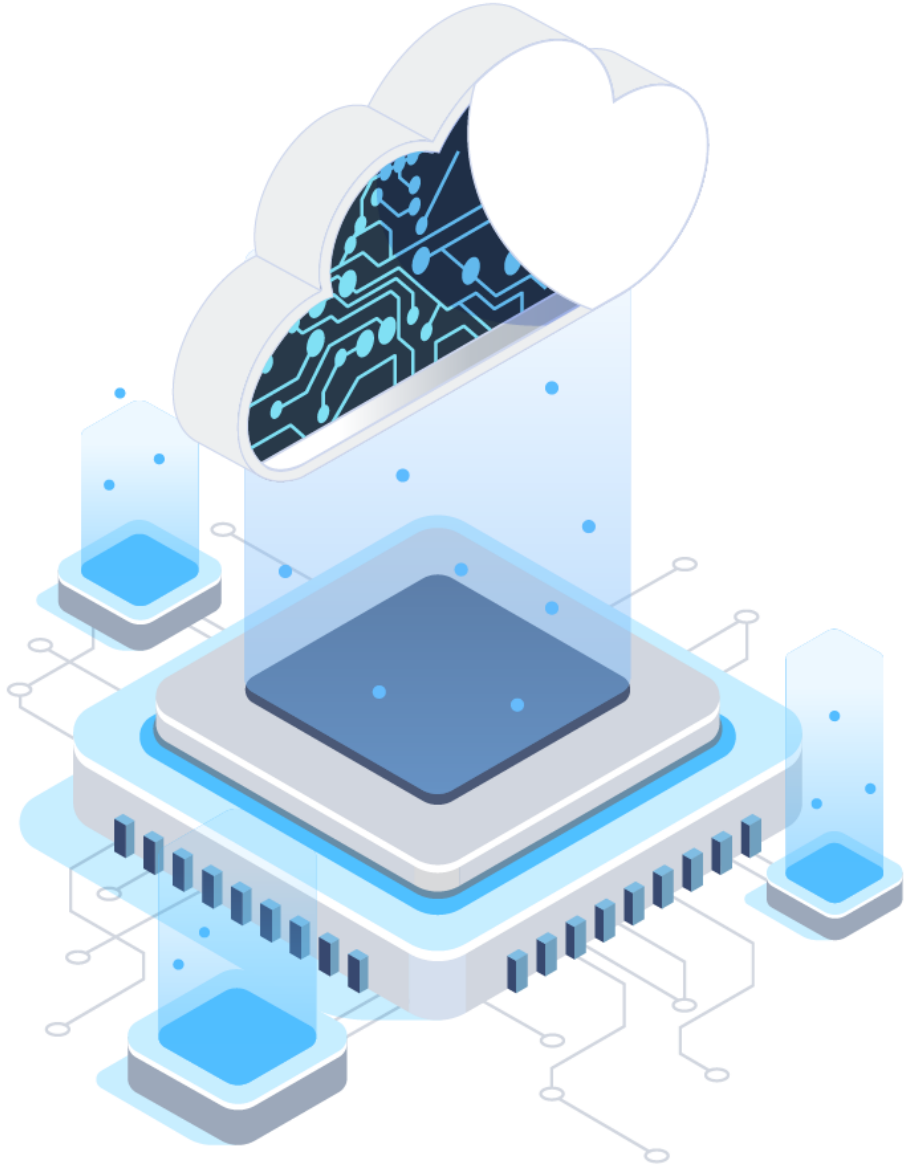
Jordan Scott - Cyber Solutions Architect - February 25, 2025

AGENDA

- Problem / Background
- Solution Components
- Parsons Solution
- Questions / Discussion

PROBLEM STATEMENT

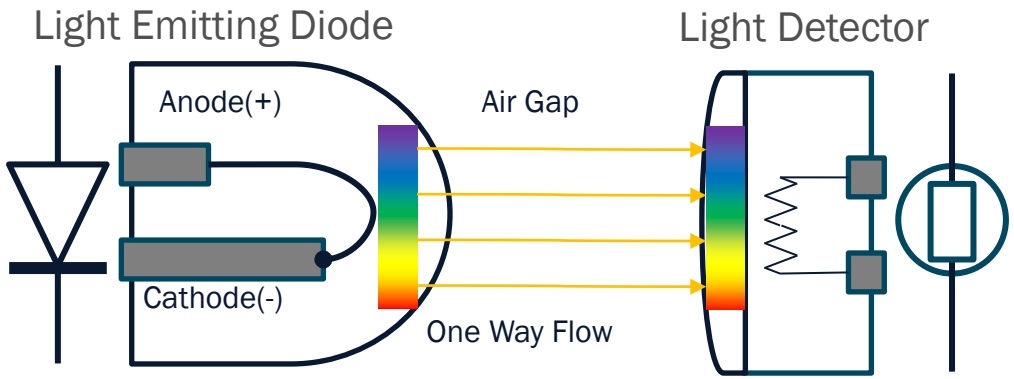
How can organizations design and implement a modern cross domain solution that effectively integrates containerization, DevSecOps, FPGA technology, and zero trust architecture while meeting RTB standards to enable secure information sharing across multiple classification levels in cloud-based space operations?



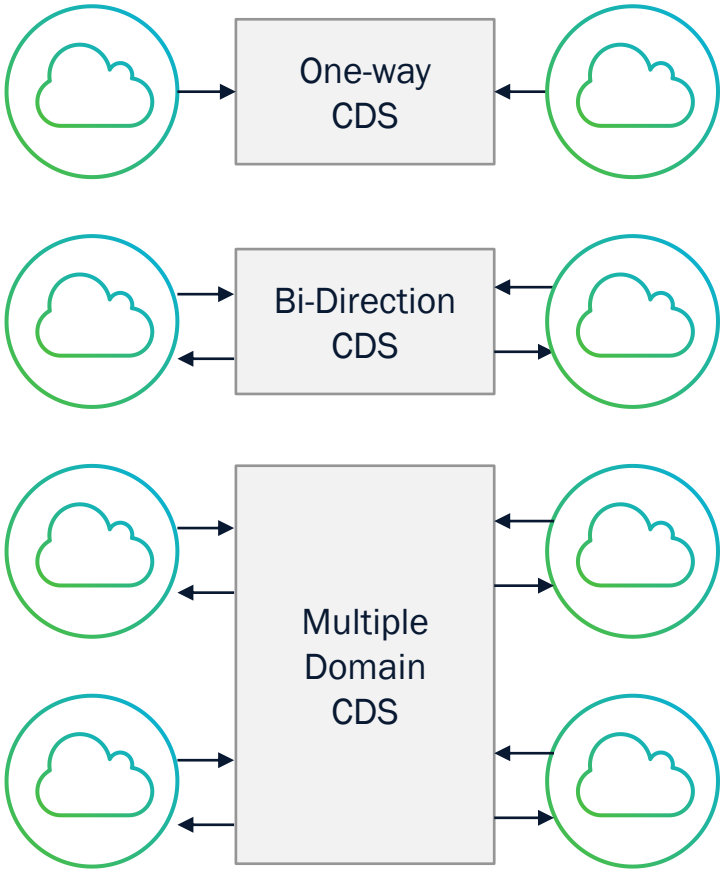
CDS FUNDAMENTALS

A **cross-domain solution** (**CDS**) is an integrated information assurance system composed of specialized software or hardware that provides a controlled interface to manually or automatically enable and/or restrict the access or transfer of information between two or more security domains based on a predetermined security policy. ~Wikipedia

LIGHT EMITTING DIODE AIR GAP



Example CDS Designs



CDS MISCONCEPTIONS

Only For Classification Domains...

Where You Find Them Fielded.

Guaranteed To Prevent Spillage...

Once It Is Implemented.

Only Million-dollar Solutions Work...

And Can't Be Cheap.

Takes A Year To Implement...

And Can't Quickly Be Changed.

CDS CHALLENGE QUESTIONS

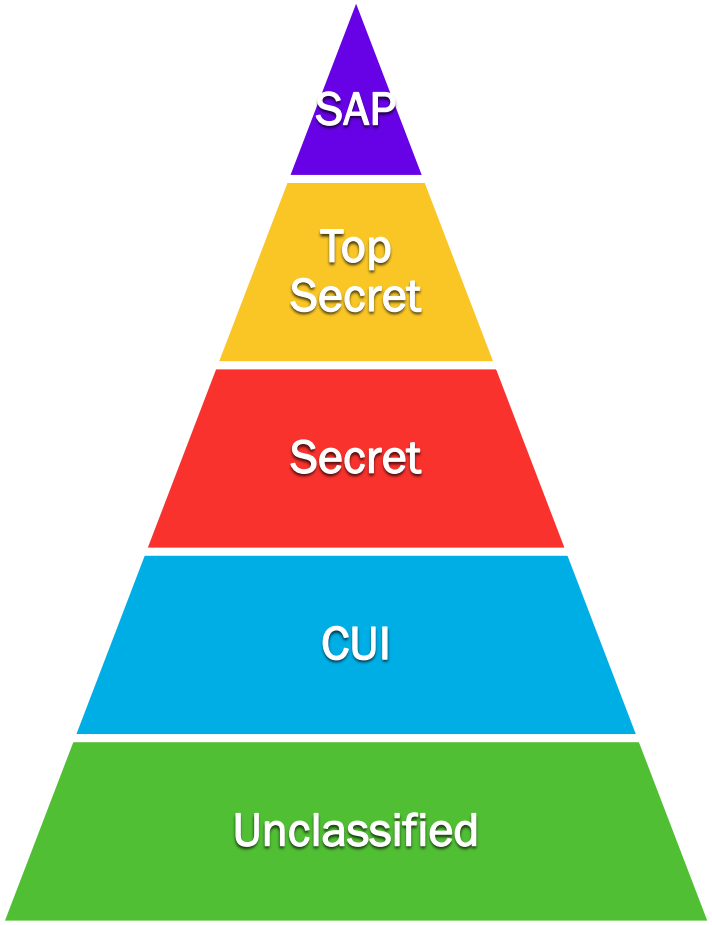
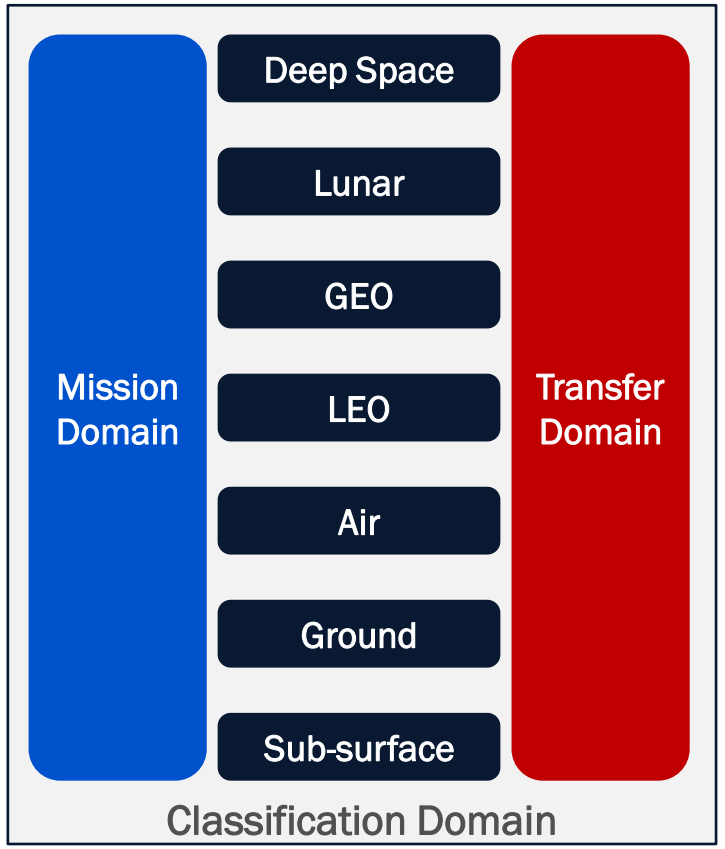
Scale

- Can your system/enclave implement 100 cross domains?
- Does your cyber monitoring include 100 segmentations within your architecture?
- Can the CDS handle Tbps?
- Can Systems Engingeering handle 1000s of cyber requirements?

Sustainment

- Should We Build a New CDS?
- Can the CDS rules change every 15 minutes?
- Can you actively monitor the CDS logging at scale?
- Can it handle changing cyber requirements quarterly?

MULTI-LEVEL, MULTI-DOMAIN PROBLEMS

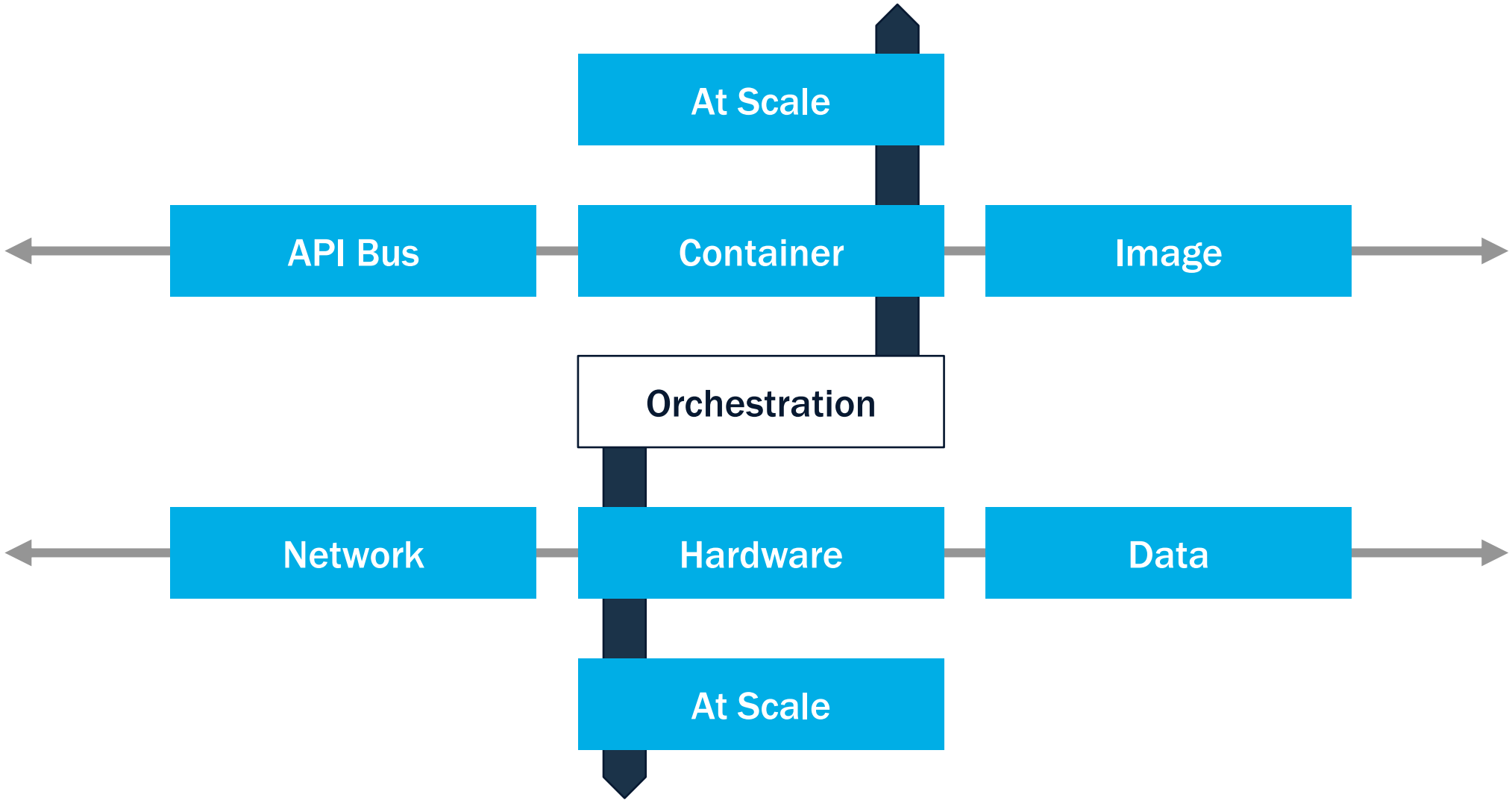
Domain Layers You Want	Domain Organization You Want	Domain Management You Get
		

PARSONS SOLUTION

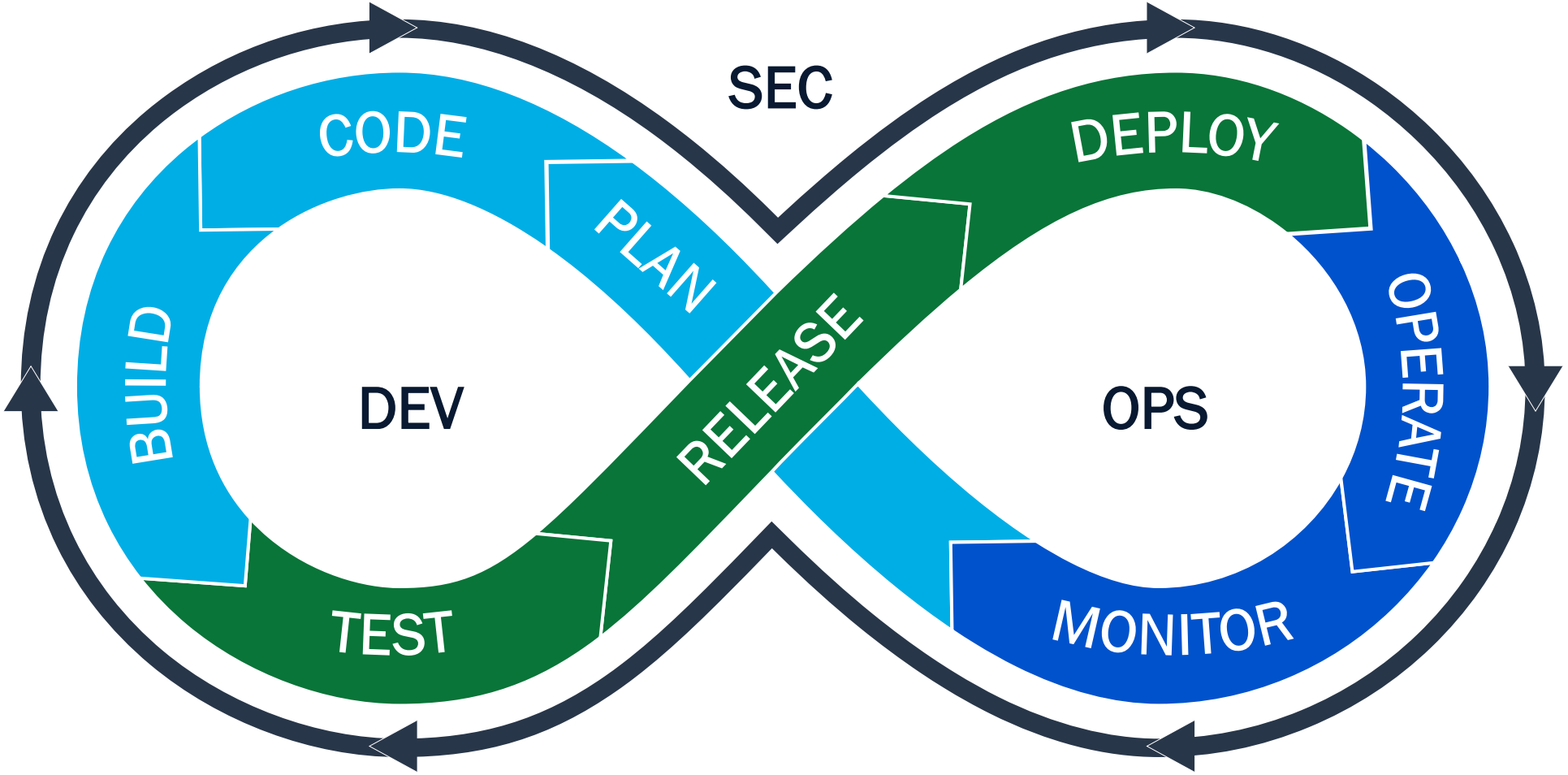
Parsons Architecture for Resilient SPACE Enterprise CDS (PARSEC) integrates Containers, DevSecOps practices, FPGA technology, alongside "Raise The Bar" standards and Zero Trust principles to address these multifaceted challenges. The core components of PARSEC are:

- Containers
- DevSecOps
- Field Programmable Gate Arrays (FPGAs)
- "Raise The Bar" (RTB) Initiatives
- Zero Trust Architecture

CONTAINERS


At Scale
API Bus
Container
Image
Orchestration
Network
Hardware
Data
At Scale

DEVSECOPS


SEC
CODE
PLAN
BUILD
TEST
RELEASE
DEPLOY
OPERATE
MONITOR
DEV
OPS

FIELD PROGRAMMABLE GATE ARRAY (FPGA)

FPGAs are reprogrammable hardware that use hardware description languages (HDLs), such as VHDL and Verilog, much like that of application-specific integrated circuit (ASIC) configuration.

- Similar to Software Defined Radios in concepts.
- Similar to Infrastructure as Code (IaC).
- Reprogramability offers physical architecture modifications.

RAISE THE BAR

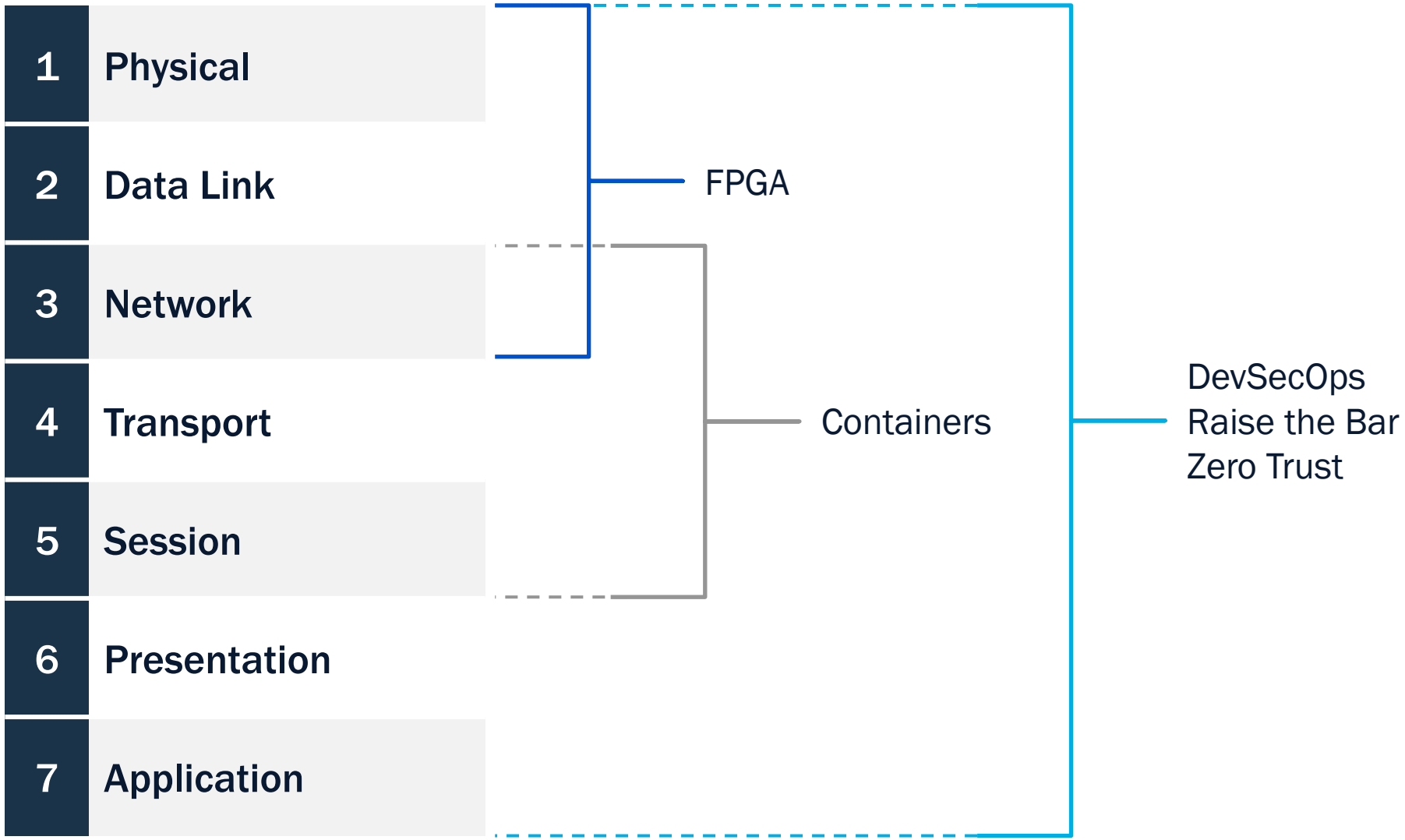
Raise the Bar is a strategy for improving cross domain solution security and capabilities from a design, development, assessment, implementation, and use perspective.

- FOUO/CUI and not portion marked well for public release.
- Offers CDS Implementation Models, Risks, Threats,
- Suggests Defense in Dept, Security by Design, and general Cybersecurity Best Practices
- Includes Design Patterns and a bunch of requirements!
- 211 acronyms!

ZERO TRUST REFERENCE ARCHITECTURE PRINCIPLES

Principle 1	Assume **no implicit or explicit trusted zone** in networks.
Principle 2	**Identity-based authentication and authorization** are strictly enforced for all connections and access to infrastructure, data, and services.
Principle 3	Machine to machine (M2M) **authentication and authorization** are strictly enforced for communication between servers and the applications.
Principle 4	Risk profiles, generated in near-real-time from monitoring and assessment of both user and devices behaviors, are used in **authorizing users and devices to resources.**
Principle 5	All sensitive data is **encrypted both in transit and at rest.**
Principle 6	All events are to be **continuously monitored**, collected, stored, and **analyzed** to assess compliance with security policies.
Principle 7	Policy **management** and distribution is **centralized.**

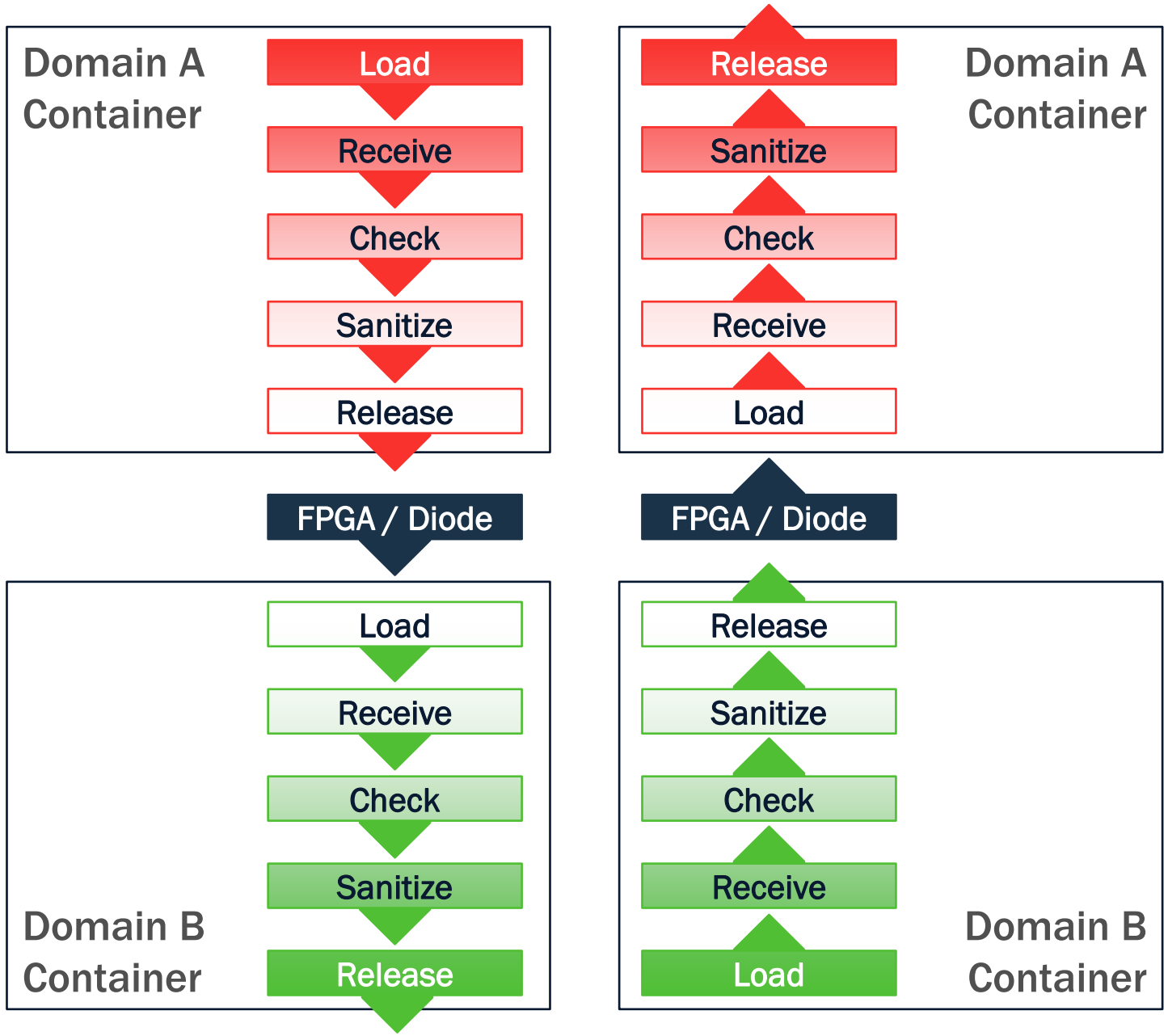
PUT IT TOGETHER… (NOTIONAL)



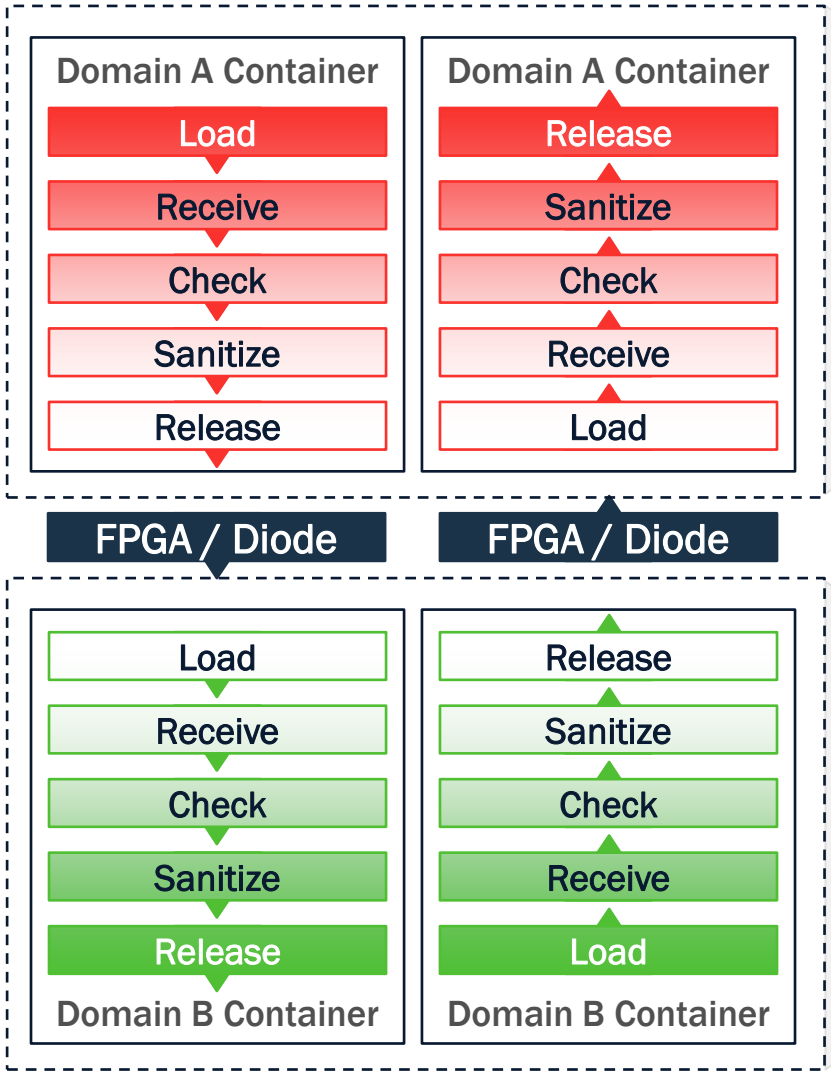
PARSONS ARCHITECTURE FOR RESILIENT SPACE ENTERPRISE CDS (PARSEC)

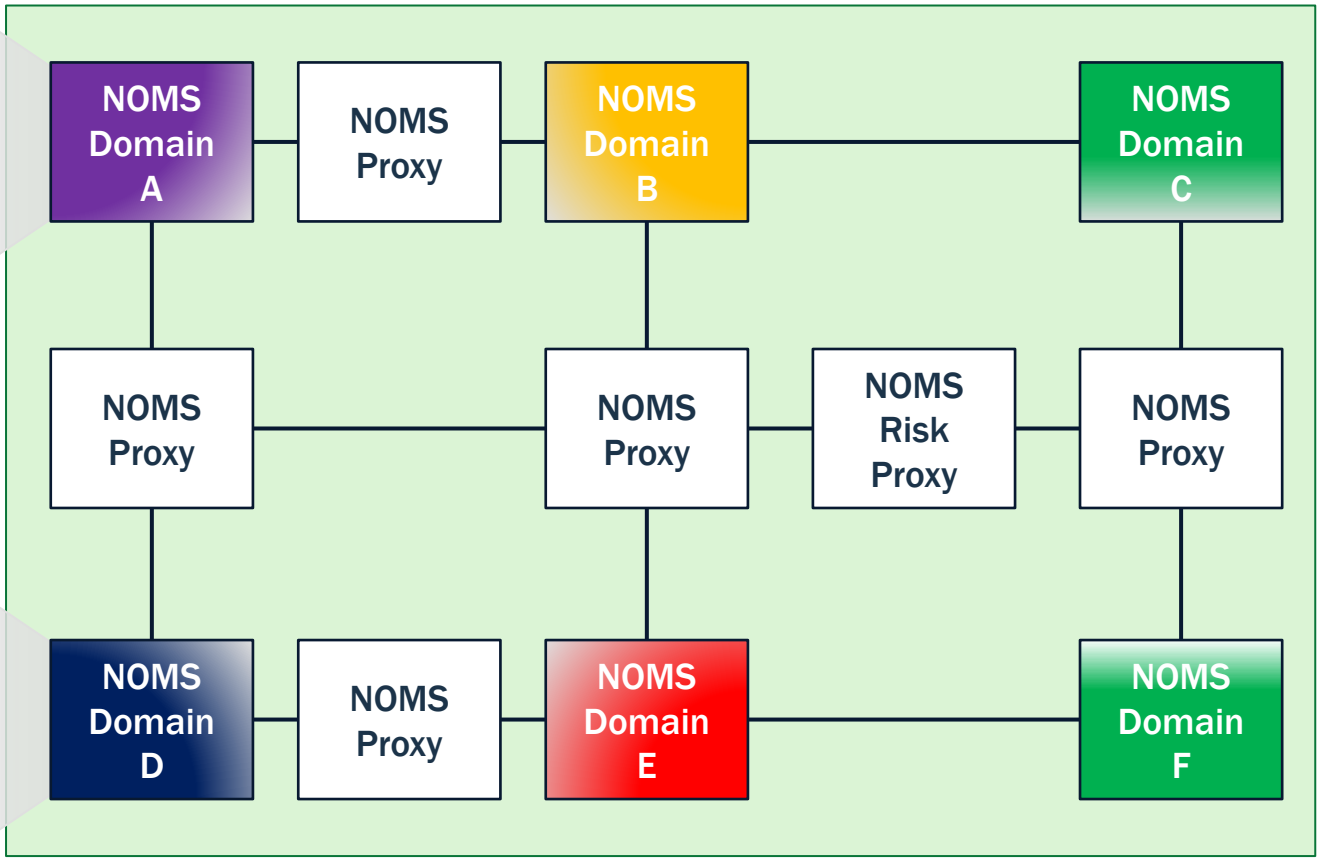
MULTI-CONTAINER BASED WORKFLOW

Using Network-Independent Open Messaging Service (NOMS)

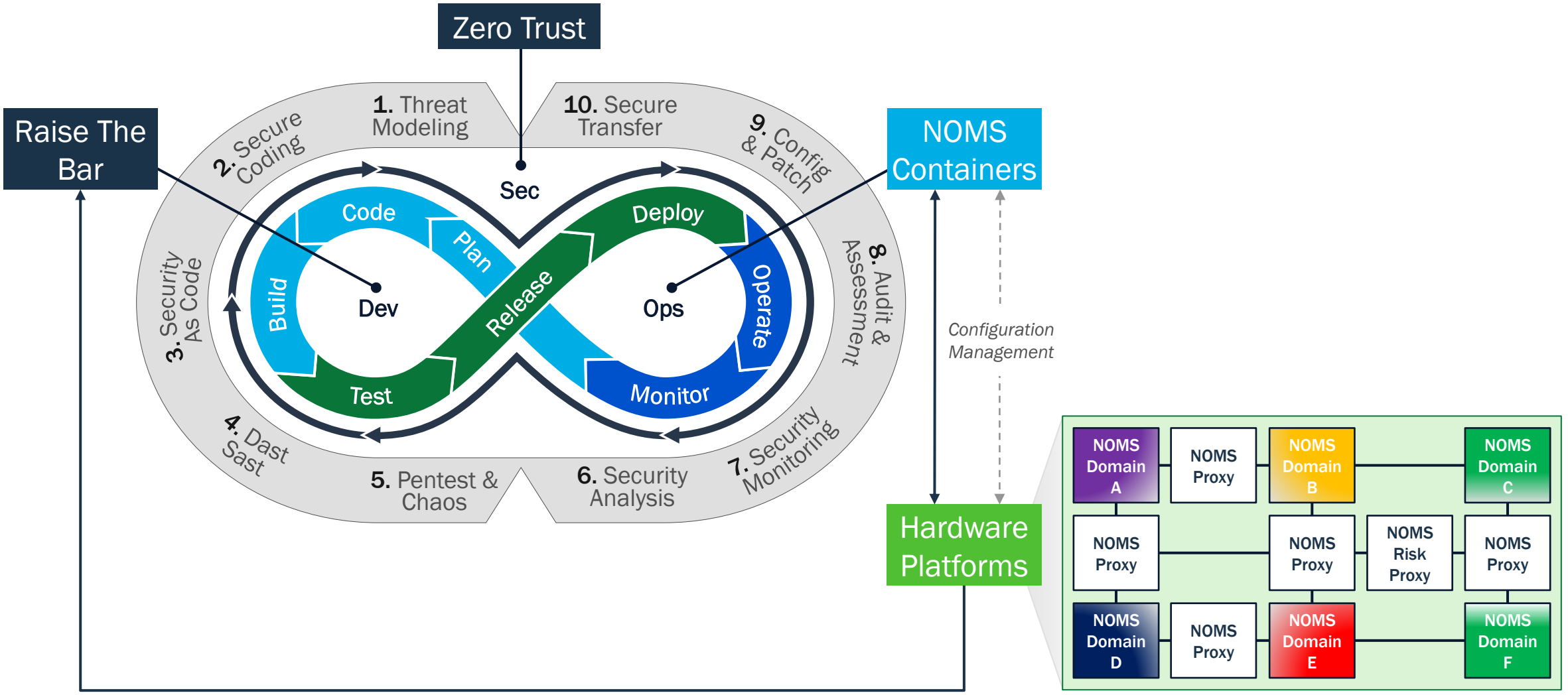


MULTI-PATH DOMAIN ROUTING

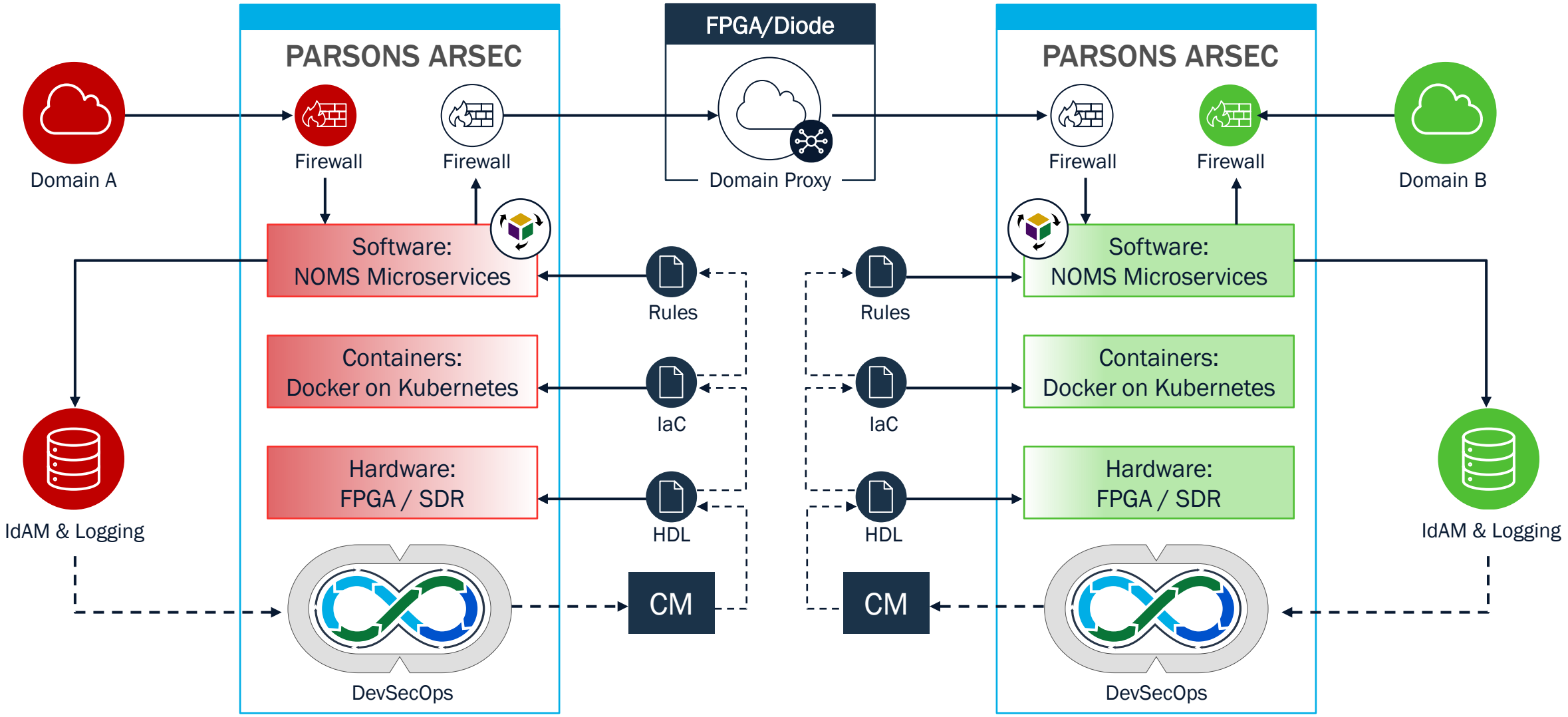




INTEGRATED DEVSECOPS APPROACH



PARSEC IMPLEMENTATION EXAMPLE



QUESTIONS?