Next-Gen National Security Applications

Using Cross Domain Hybrid
Application (CDHA) Framework

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Designing Secure Applications

| The Problem

As national security threats evolve, data silos and fragmented security domains create operational inefficiencies and elevate security and compliance risks. These challenges are further compounded by two critical issues:

- **Data Aggregation Risks** - Unprotected sensitive data at the OFFICIAL classification is a prime target for Hostile State Actors.
- **Restricted Visibility & Access:** Isolated SECRET systems, limit operational agility and cross-domain collaboration.

To mitigate these risks, appropriate security measures must be implemented - enabling secure interoperability.

Examples of Next-Generation Secure Application Use Cases

1 Vetting Process

2 NIS Data

3 CAF Documents

4 Cross-Domain Collaboration and Intelligence Sharing

5 Government and Law Enforcement

6 Secure Identity Management & Access Control

| The Solution

Cross Domain Hybrid Applications (CDHA) – Enabling Secure Interoperability Across Security Domains

With increasing regulatory pressure from NIS2, CAF, and the Cyber Resilience Bill, organisations must adopt solutions that go beyond basic data transfer - they need operational efficiency, cryptographic security, and seamless cross-domain application functionality.

CDHA is a next-generation approach - a secure application framework designed to address these challenges. It enables data protection across all classification levels, mitigating data aggregation risks at OFFICIAL, and enabling authorised access to SECRET environments without compromising security.

With quantum computing poised to disrupt traditional encryption, Acubed IT is integrating **Post-Quantum Cryptography (PQC)** into the CDHA Framework (in collaboration with Edinburgh Napier University), to ensure future-proof data security across OFFICIAL and SECRET domains.

Key innovations include:

- **ML-KEM and ML-DSA Algorithms:** Strengthening encryption against quantum-based threats.
- **Homomorphic Encryption (HE):** Enabling secure computations on encrypted data without decryption.
- **Attribute-Based Encryption (ABE):** Allowing controlled data sharing across domains based on user roles and security clearances.
- **AI & ML-Driven Export Controls:** Automating compliance and security checks for secure cross-domain transfers.

Together, these innovations will reinforce CDHA's long-term security and resilience, ensuring it remains ahead of emerging cyber threats.

CDHA is more than just another Cross Domain Solution - it represents the next generation of secure applications, bridging the gap between security and usability to enabling data-driven decision-making while safeguarding critical information.

Acubed IT is currently working with an **HMG SECRET Platform** team to deliver **Next-Generation National Security Applications**, enabling secure interoperability across OFFICIAL and SECRET networks.
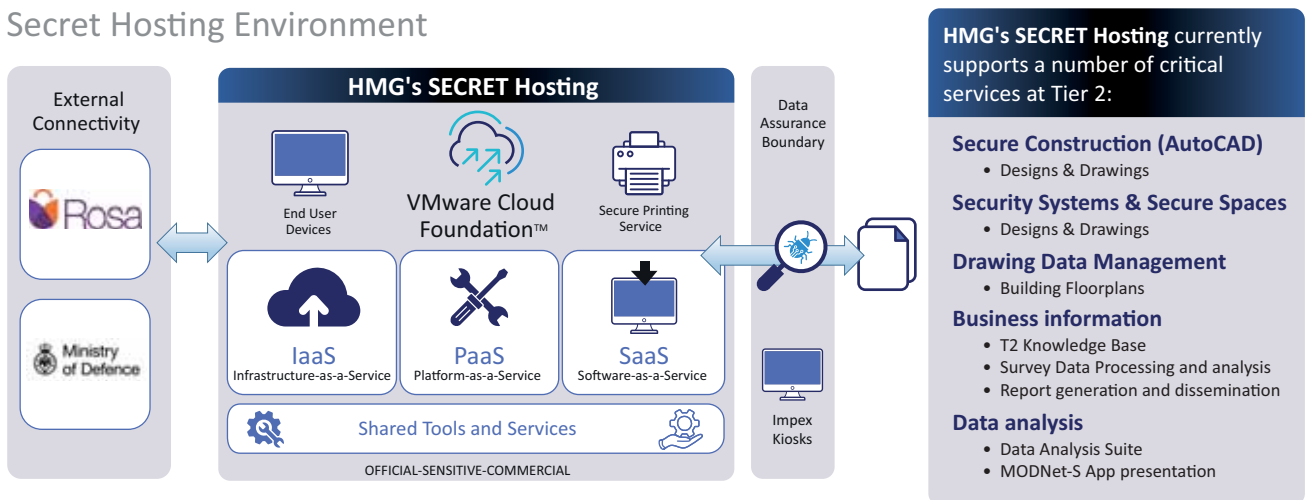
HMG's SECRET Hosting

A Flexible, Tier 2 (SECRET) Hosting Service
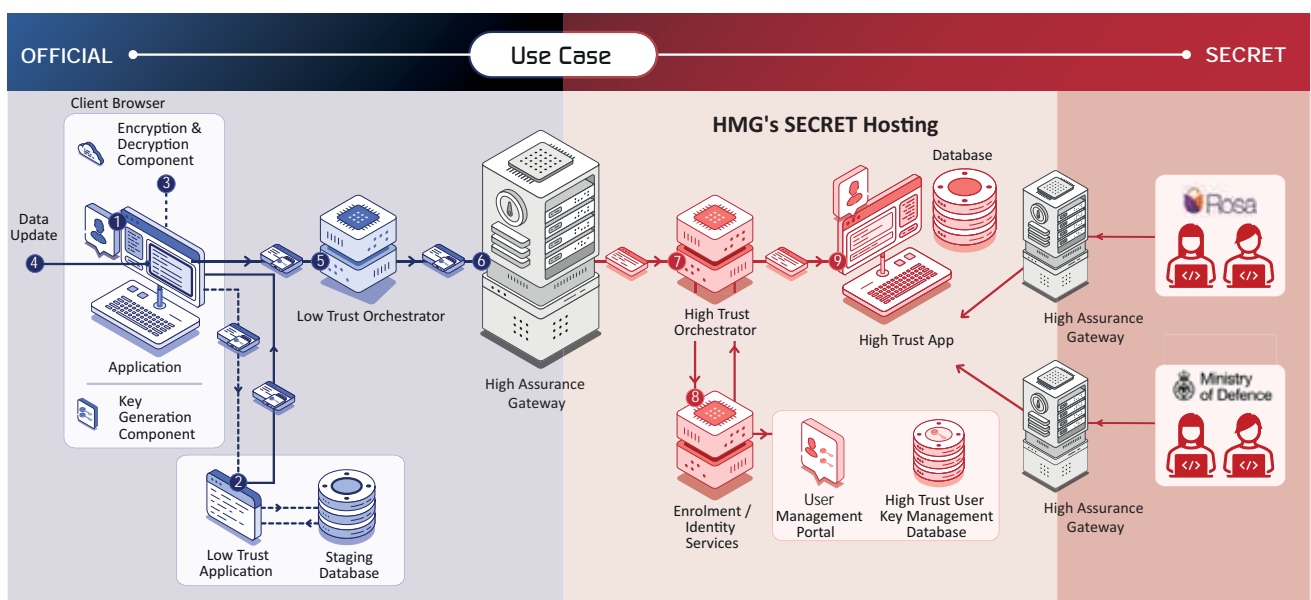
UK Government

HMG's SECRET Hosting is a Tier 2 Community Cloud designed specifically for the UK Government and its trusted partners, providing a highly secure and resilient infrastructure. Hosted across two data centres, HMG's SECRET Hosting leverages Broadcom V-Cloud Foundations technology to deliver a fully virtualised infrastructure and networking within an 'air-gapped' environment. With an in-house project delivery and engineering team, as well as dedicated service management and help desk functions, HMG's SECRET Hosting ensures seamless support and operational excellence. Security is reinforced through an in-house Tier 2 Security Operations Centre (SOC), offering continuous monitoring and protection:

Secret Hosting Environment

HMG's SECRET Hosting currently supports a number of critical services at Tier 2:

Secure Construction (AutoCAD)
- Designs & Drawings

Security Systems & Secure Spaces
- Designs & Drawings

Drawing Data Management
- Building Floorplans

Business information
- T2 Knowledge Base
- Survey Data Processing and analysis
- Report generation and dissemination

Data analysis
- Data Analysis Suite
- MODNet-S App presentation

Example Topology using CDHA and HMG's SECRET Hosting

The CDHA and HMG's SECRET Hosting application will have the best of both worlds. Data will continue to be collected at OFFICIAL while enabling MOD and Rosa users to access the application from their network. This approach allows many departments to mitigate the risks associated with data collection at OFFICIAL while also leveraging the investment made in the Rosa ecosystem.

How does the CDHA Framework differ from Cross Domain Solutions (CDS)?

1 **Data Protection at the OFFICIAL domain** - CDS primarily protects the SECRET network but does not protect data at the OFFICIAL domain. CDHA encrypts data from the moment of creation, ensuring protection before it moves to higher domains.

2 **Operational Efficiency** - With CDS, users must manually move data to higher domains. CDHA allows secure data processing at lower classifications while keeping aggregation at higher domains - reducing duplication, manual work, and inefficiencies.

3 **Secure Access to SECRET Data from OFFICIAL Devices** - In CDS environments, higher domain data is often inaccessible from OFFICIAL systems. CDHA allows secure, controlled access to portions of higher domain data from OFFICIAL devices, ensuring real-time decision-making without compromising security.

4 **Future-Proof Cryptography** - While CDS relies on legacy security models, CDHA integrates Post-Quantum Cryptography (PQC), Attribute-Based Encryption (ABE), and Fully Homomorphic Encryption (FHE), ensuring long-term security against evolving threats.

The Value of CDHA: How it Benefits your Organisation

Reduces Risk of Data Breaches - Protects sensitive data even before it reaches higher classification environments.

Improves Operational Efficiency - Eliminates security bottlenecks by enabling secure data interoperability.

The Acubed Advantage: Why Choose Us?

Acubed IT specialises in designing and implementing Next-Generation Secure Applications built on the CDHA Framework. Our expertise in cross-domain security and secure application development enables us to tackle complex data security challenges that others can not address.

Having worked in collaboration with the NCSC on the CDHA Framework development, we bring extensive technical knowledge and practical insight into how CDHA can be effectively applied to real-world use cases. This experience enables us to design and develop secure applications that seamlessly integrate across security classifications, providing robust data protection, operational efficiency, and compliance with evolving security regulations.

With a proven track record in national security, defence and critical infrastructure, Acubed IT is dedicated to driving secure digital transformation through innovative, scalable, and resilient solutions.

Contact us now for more information:

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