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BATTLEFIELD DIGITILISATION

Thoughts on building and securing the Digital Backbone

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PROPRIETARY INFORMATION

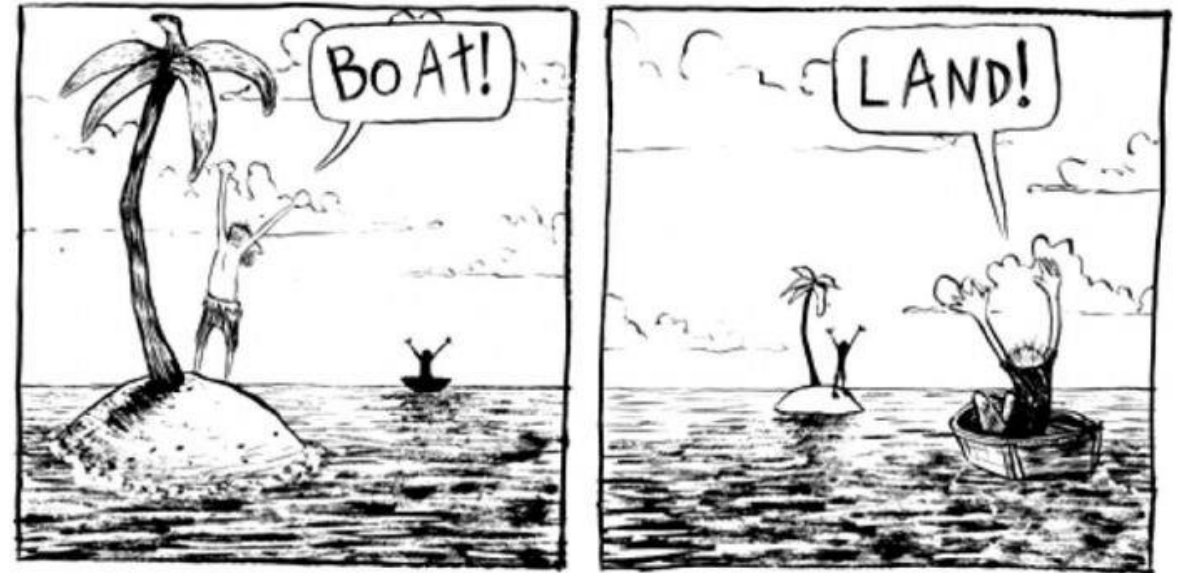
Framing this presentation



What follows are thoughts, observations and ideas from my perspective.

Hopefully will generate further discussion and engagement for when we are able to meet again in person

Would love to hear your views



Agenda



- Introduction
- Why? - MDI
- **Battlefield digitization –The vision**
- **Building the digital backbone**
- Scenario
- **Building the digital backbone**
- **Securing the digital backbone**
- **Conclusions**
- Coda



Why? – Multi Domain Integration (MDI)



Doctrine

- JCN 1/20 Multi Domain Integration
- Integrated Review 2021

Holistic approach to meeting threats and maximising influence

Permanent state of war – concept expanded beyond that considered traditional (*Changing character of war*)

Industrial age to Information age

Distinction between domains is declining due to pervasive relevance of space, cyber and EM Spectrum

Information supremacy and networking of decisive elements

Information Advantage is one of the principle of MDI tenents



Vision – setting the scene



*Warfare is increasingly about a competition between hiding and finding. It will be enabled at every level by a **digital backbone** into which **all sensors, effectors and deciders will be plugged***

CDS Gen Nick Carter Sept 2020 - Introducing the IOC

The foundation of our multi-domain integration will be a resilient digital backbone.

Integrated Operating Concept 2025 Primer May 2020

In Defence there is a real ambition at the senior level to really leverage and exploit digital and information technologies for Defence output purposes in a genuinely transformative way.

*That is first and foremost and primarily military and intelligence capability, but it's **also how we run the business and how we run the department, and how we work with allies and partners.***

Ministry of Defence CIO, Charles Forte – CIO 16 Dec 2020

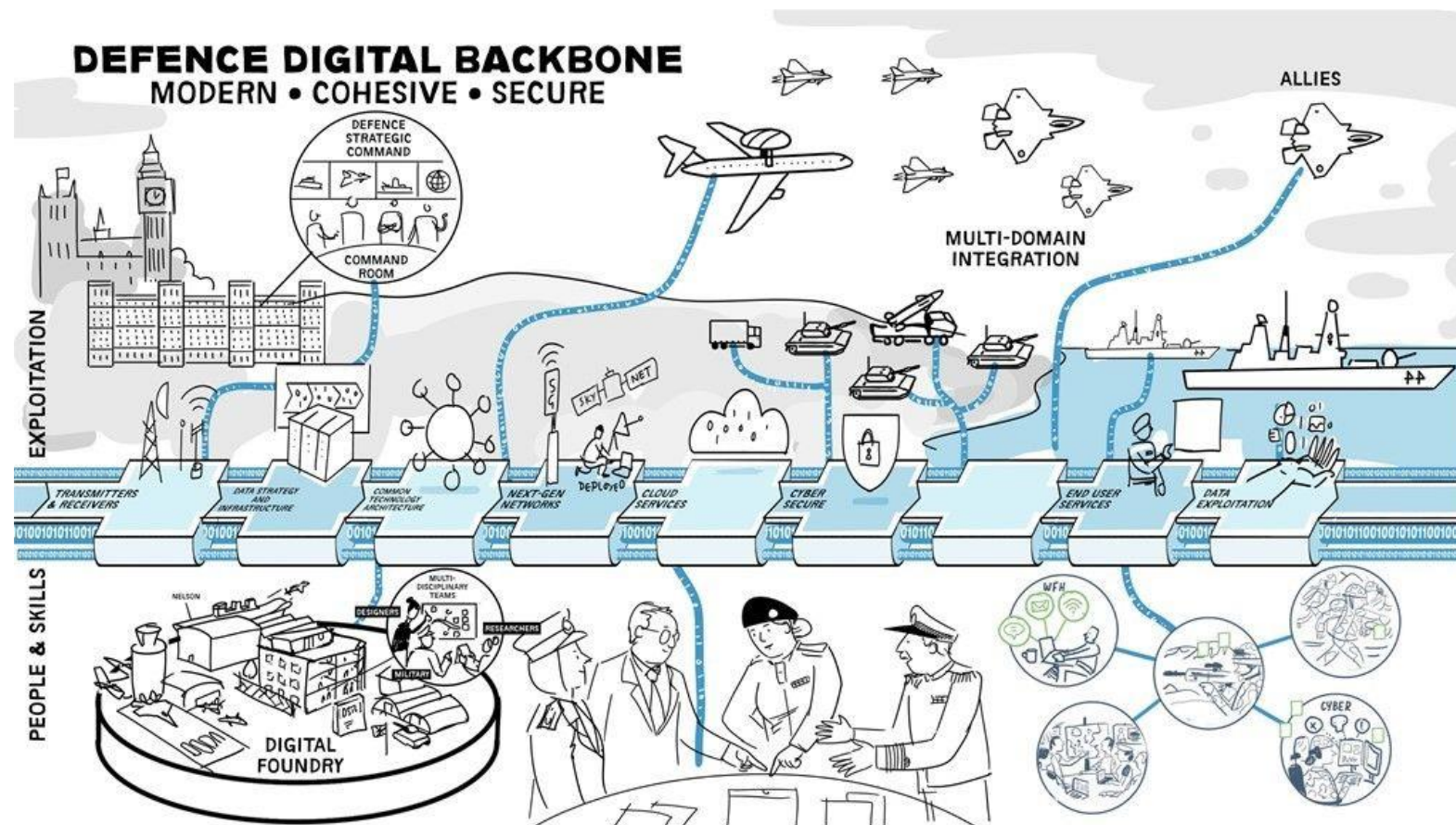
*Digital is affecting us **both in the battlespace and the corporate space, and it's both a threat and opportunity.** There is a false boundary between the two, as across both areas digital is disrupting and empowering us in the same way, as it is everywhere else. Whenever I talk to banks, retail companies, big utilities or other government departments, I have exactly the same conversations as I have internally. I'm here to understand how we operate and fight better with digital, but we'd be mad if we weren't looking at how digital can help us run our internal systems better too."*

Director of Military Digitisation, Major General Tom Copinger-Symes - Jan 2021

Battlefield Digitilisation – The vision



Army Digitalisation: THEIA*



Source: UK Gov

* Other digitalisation programmes are available

Insight

Value from data

Hyper Scale Cloud (multiple classifications)

Data may reside outside organisational and boundaries

Organising data

Assuring data

The foundation of our multi-domain integration will be a resilient digital backbone.

Integrated Operating Concept
2025 Primer May 2020

Scenario



“Big Board” Situational Awareness



Higher Formation(s)

Intelligence
Analysis
Fusion
Processing

Virtualised
Services

Corporate
Services

Satellite

Reach back

Allies Partners Other Agencies



Radar equipped BRH detects build up of enemy forces

Uses sensors to locate force elements

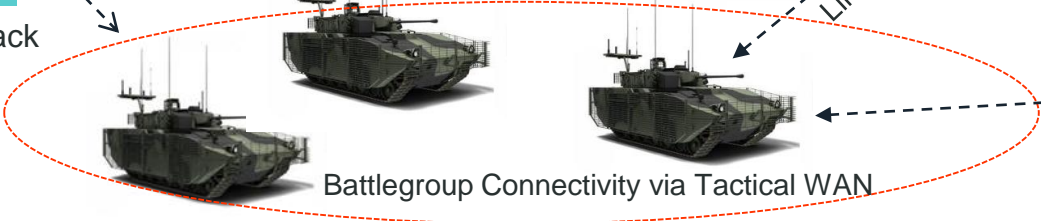
FMV over TDL



Cued targeting
sensors

Strike package directed

Aviation
C2
Link 16

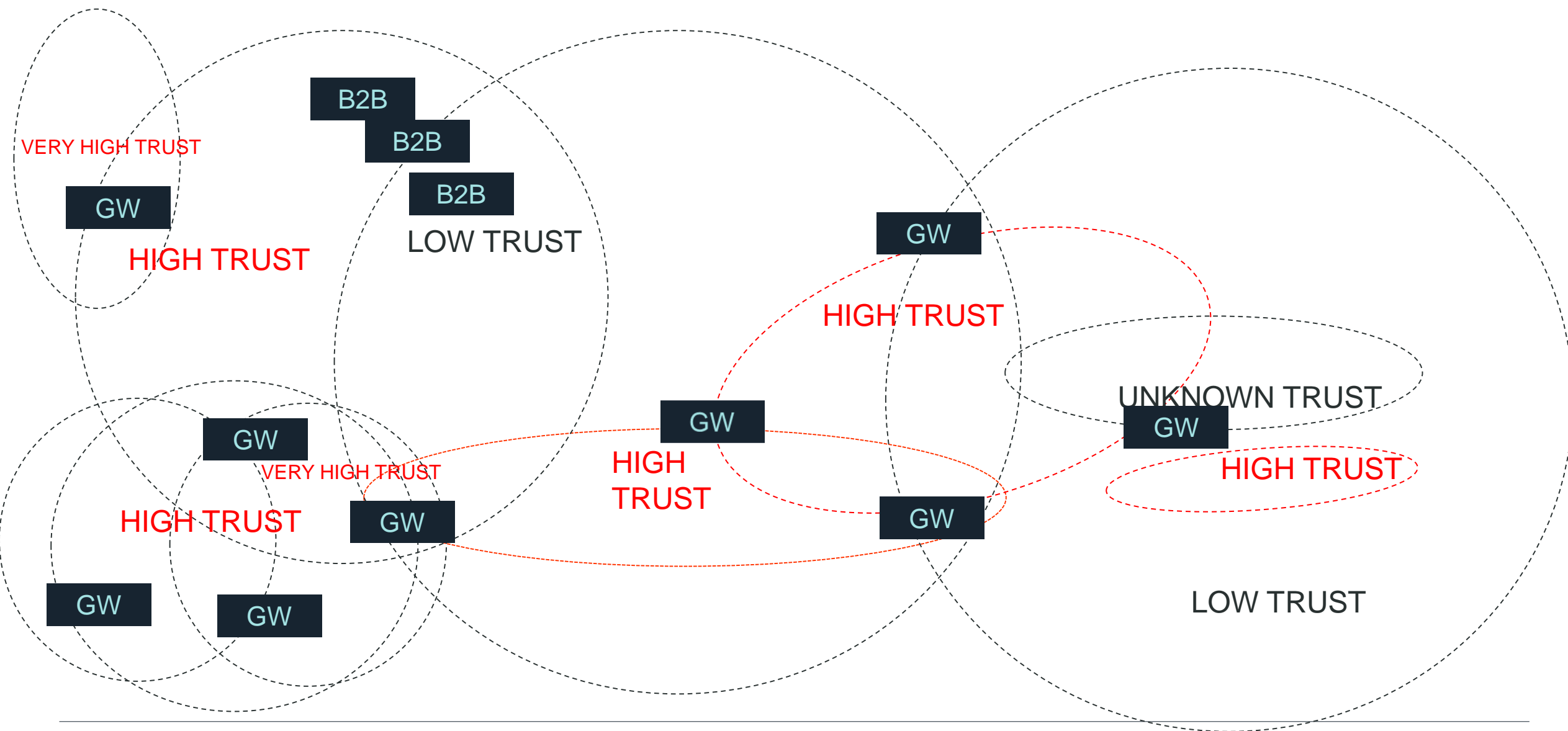


Battlegroup Connectivity via Tactical WAN

Acoustic & EM Sensors

Fwd Recce Screen

Information assurance domains – Boundaries and Gateways



Building the digital backbone



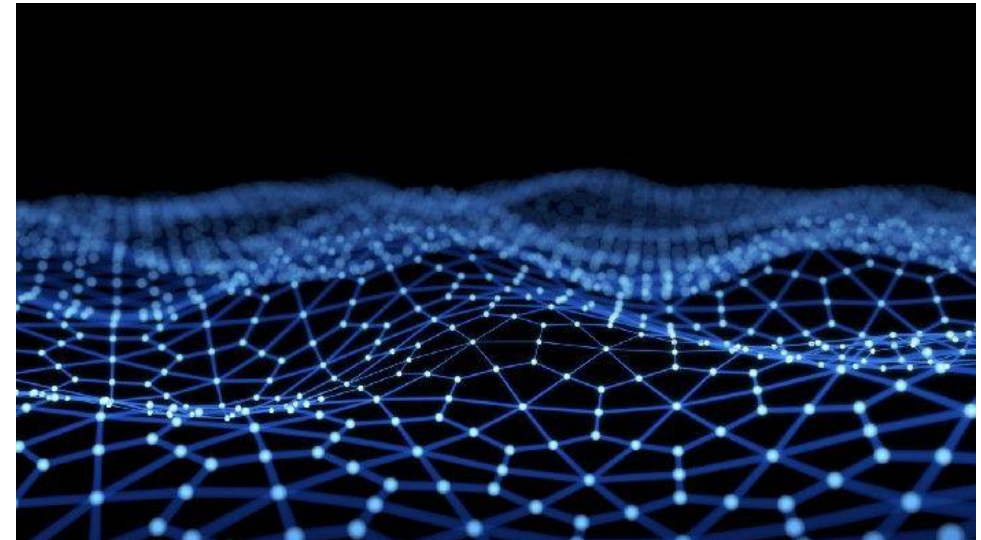
- **Likely to remain a federated system for sometime**
 - No blank sheet – many existing components
 - Hybrid/Heterogenic architecture
- **Automation**
 - “Too “big and too fast” for humans to easily visualise and control
 - Orchestration of elements
 - Interfaces/APIs
 - AI/ML elements for triage
- **Standards approach**
 - Networking/Interoperability
 - Data/Information standards
 - Ontologies, taxonomies, vocabularies
 - formats, types, transfers, maps

Securing the digital backbone



Tension between “battlespace edge” and “corporate core”

- Cyber physical systems (IoT) v enterprise security standards and practices
- Connected/Complex
- Data and information will have to bridge
 - Cross Domain
 - High Assurance
- **Resilience**
 - Ability to recover from attack/failure and maintain service
- **Protection**
 - Data in Transit/Data at Rest
 - Automation of security functions
 - Key distribution
 - Event monitoring

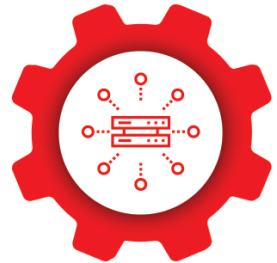


Fundamentals for the future



OPEN SYSTEMS

Integrating systems and avoiding customized systems that often cause vendor lock



MULTI-FUNCTION SOLUTIONS

Platforms that perform multiple missions from one set of hardware



SOFTWARE DEFINED EVERYTHING

Delivering mission requirements via software code as opposed to single-use hardware

Problems and Issues

- Vendor Lock in
- Monolithic
- Difficult to Upgrade

- Too many boxes!
- SWAP constraints
- Agility

- Slow to adapt
- Mission time
- Benefit from efficiencies

Solutions and benefits

Long time advocate and user of Open Standards in products

- Portability
- Open Source Operating Systems

Multi Role architecture and technology:

- Economies

Applications and mission profiles:

- Delaminated architectures
- Mission requirements via software applications, rather than single use hardware

Breaks legacy lock in and enables hardware reconfiguration for new and evolving missions

Conclusions



Digital Backbone is critical to the realisation of the MDI concept

Complex and interconnected - Hybrid

Automation of process is essential

- Orchestration of system components
- Assistance in management of data

Standards

Security and resilience

Fresh approach for agility and freedom of manoeuvre

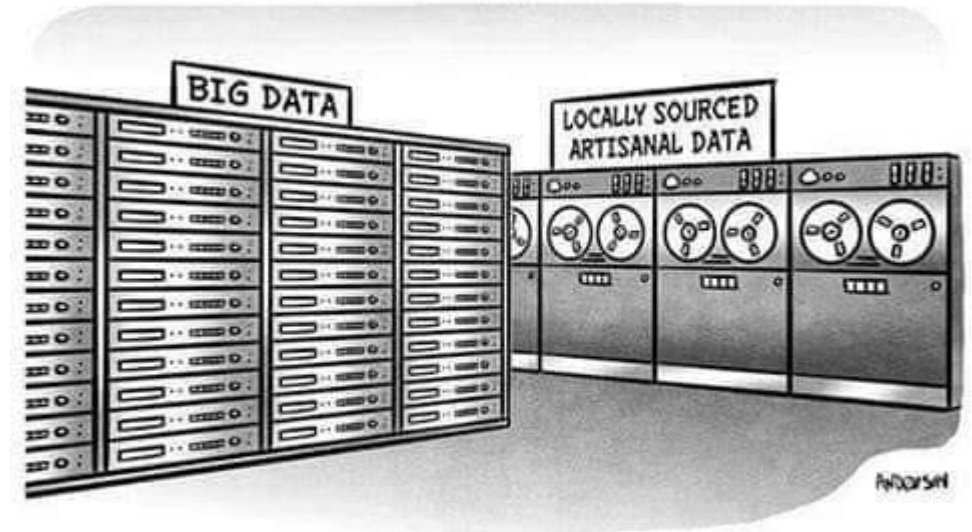
Open Systems

Multi Use

Software defined

Team Sport – need to work in partnership

WWW.ANDERZTOONS.COM





“Angels Three Zero” by Douglas Chowns
Bentley Priory Museum

Information advantage is not new.

The need for the executive to make *better informed* and *timely* decisions has not diminished – if anything the requirement has increased..

“Analogue Backbone”

This is the next stage of evolution in the quest for information supremacy

Technology should assist and not hinder.



Thank You

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