BAE SYSTEMS

DDS as an integration middleware

BAE Systems Integrated System Technologies (Insyte)
Alan Minister, C2 Technology Manager

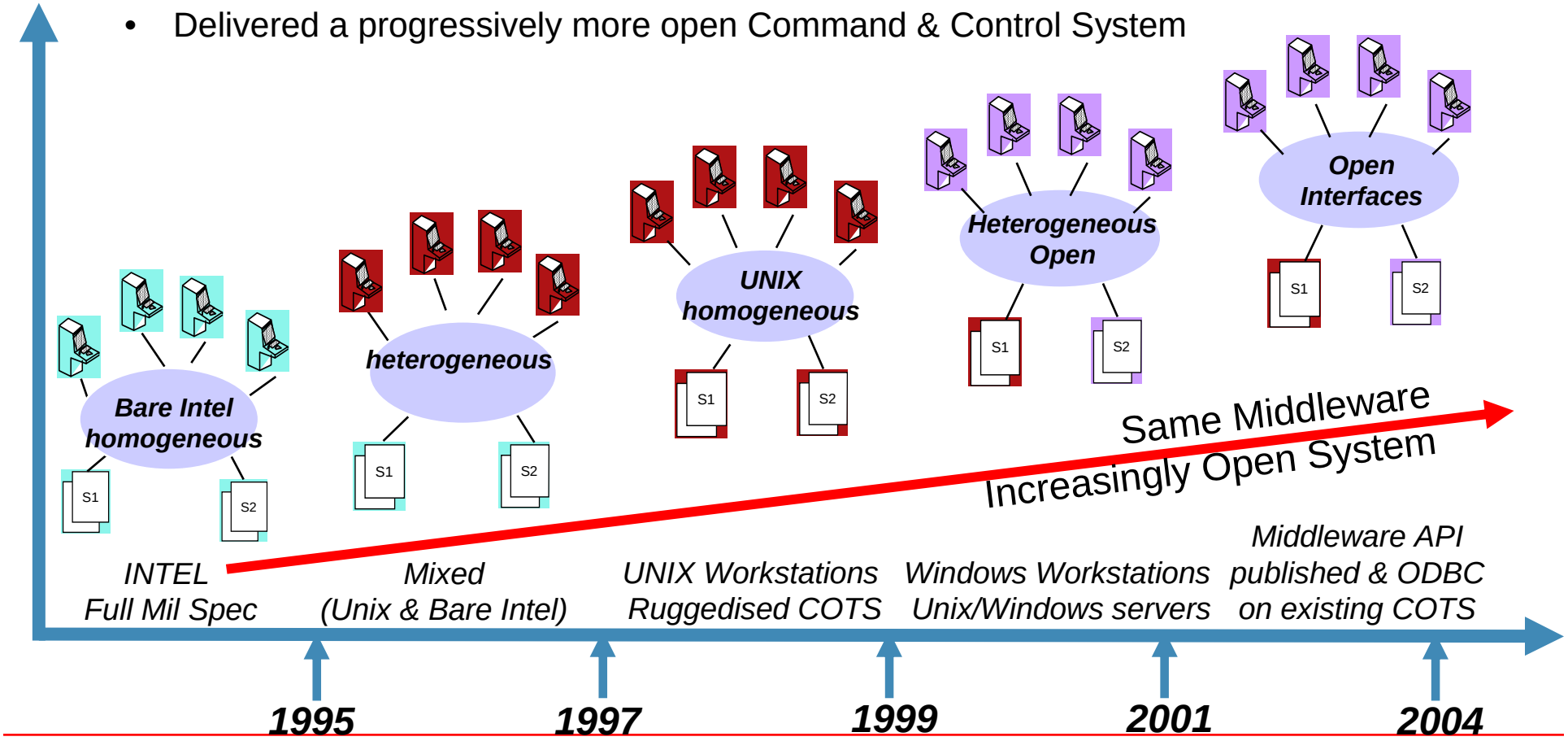
Company Background

- Integrated System Technologies (Insyte) limited
  - UK Systems Integration business for BAE SYSTEMS
  - Structured into
    - **Naval** – Command & Control, Training, Through Life Configuration Management
    - **Land** – Air Picture & Integrated Air Defence, Information Systems
    - **Joint, Air & ISTAR** – Command Battle Management, Secure Systems
    - **Homeland Security** – Critical Infrastructure, National Security, Border & Coastal Surveillance
  - Staff/locations
    - Throughout the UK – 14 sites
    - 4000 employees
  - Command & Control business cuts across the domains
    - Convergence to a common system is the goal

BAE SYSTEMS

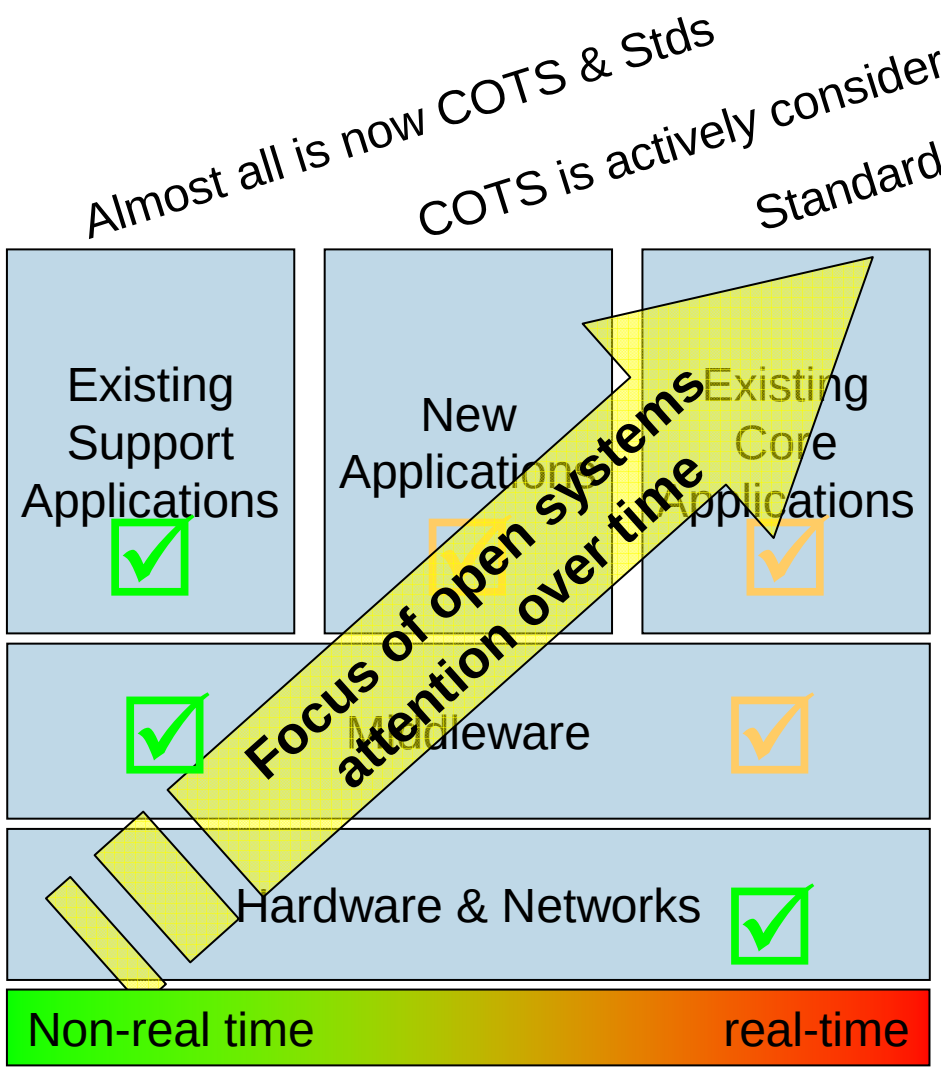
Middleware Background

- Within Command & Control – CMS-1
  - Started from bespoke hardware & in-house middleware isolation layer
  - Delivered a progressively more open Command & Control System



BAE SYSTEMS

Open Systems – CMS-1 Adoption Timeline



COTS & Standards in use for non real time applications
Actively assessed for real time

COTS & Standards in use for non real time applications
Increasingly used for real time too

Almost all is now COTS standards

BAE SYSTEMS

Middleware Current & Future

- Convergence of multi domain Command & Control Systems needs a common middleware approach
  - Either rewrite from scratch to a preferred middleware
    - Cost potentially high
    - Provenance of system lost
  - Or else wrap interfaces and rewrite on major upgrade
    - Quicker to deploy
    - More portable as middleware technologies change
- Application interfaces now the focus of attention
  - Application components are from different backgrounds
    - Need a common interchange language
    - Historically the data exchange specification (DES) used
- Aim to apply the open systems approach to the application interfaces
  - More flexible deployment options
  - Integration of new capability from disparate sources
  - DDS suited to the DES style approach in many cases

BAE SYSTEMS

DDS Evaluation Approaches

- Within Command & Control
  - Use of DDS as a low level transport replacement under current middleware
    - Not work well - paradigm mismatch
  - Generic bridge at the middleware to middleware level
    - Too costly and too tied to a single technology
  - Specific, selected bridging
    - Adoption of DDS as ‘new’ middleware environment and re-express existing well defined application data interfaces using DDS IDL
    - Port of Applications as opportunity arises
    - Retains provenance through evolution
- Cross Combat System Equipments
  - Use of DDS as an API level specification of the DES
    - Scope to reduce DES complexity/multiplicity
    - Paradigm well suited to DDS

BAE SYSTEMS

Lessons Learnt

- DDS General
  - Ideal for multi users of the same data
  - Data distribution is its strength
    - Not so well suited to control interfaces
- Middleware as a layer is more than just reliable data distribution
  - Group Ordered Communications / Transactions are needed
    - Other middleware services are needed, e.g. time, system management
  - Integration with other middlewares is necessary in most large systems
    - Need to be able to integrate different ‘resilience’ approaches
    - Glue-ware still required
- Need for interoperable open source versions of DDS
  - Academics etc. use open source CORBA because it is free but compatible with commercial
  - This makes it easier to deploy e.g. new algorithms / functions
  - Needs encouragement

BAE Systems Integrated System Technologies (Insyte) Limited
Victory Point
Lyon Way, Frimley, Camberley
Surrey, GU16 7EX
United Kingdom
Telephone +44 (0) 1276 603000
Fax +44 (0) 1276 603001

email insyte@baesystems.com
www.baesystems.com/insyte