Trusted communication for the Tactical Edge

Trusted Router by Saab connects and secures the digital battlefield.

Collaboration between international forces to defend and safeguard society has never been more important. NATO multi-national multi domain operations enable formerly separate defense organizations to collaborate and share data for enhanced situational awareness and joint tactical operation. In this new operational context, securing classified information from one operating unit to another becomes a challenge.

In parallel, digitalisation of the battlefield for enhanced surveillance and utilizing data as-an-asset calls for a shift in how defence networking and data processing systems are designed. The future of the digital battlefield requires a data centric approach for NATO Federated Mission Networking with Zero-trust and Cloud-first networking capabilities. The objective is to simplify in-troduction of new capabilities, drive innovation and support autonomous operations, while keeping information domains securely separated.

Trusted Router (T-Router) by Saab is designed to address these challenges.

It provides Trusted Domain Separation (TDS) which enables distributed cloud processing of different information classes on a shared compute and switching platform, the T-Router. TDS strictly separates port groups and virtual machines.
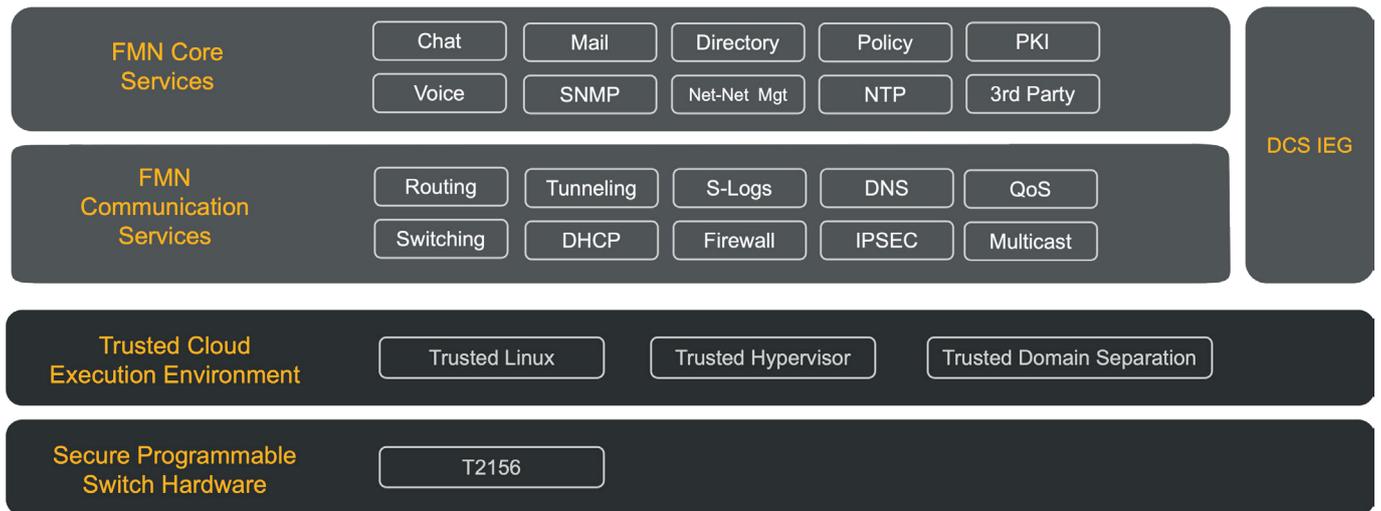
Virtual machines are isolated by forcing all control traffic via the data plane.

T-Router is designed for the highest protection against cyber-attacks with minimal attack surface.
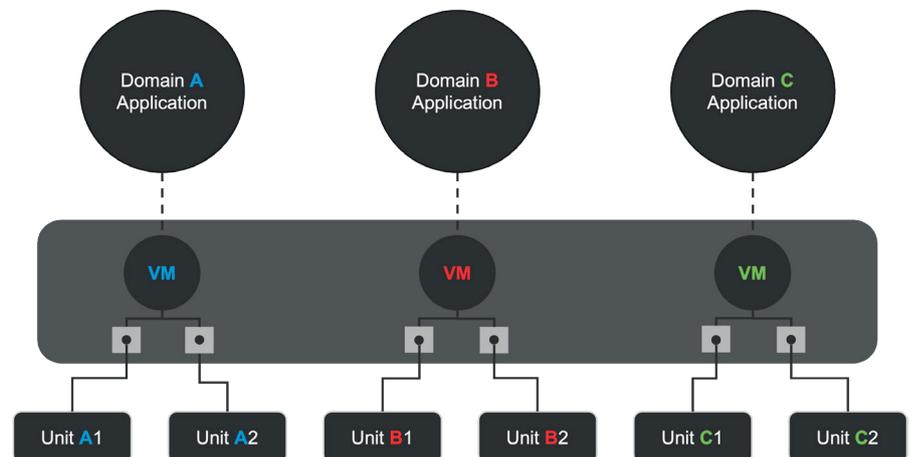
Trusted Domain Separation. A, B and C domains have dedicated virtual machines strictly connected to separated port groups.

Applications

FMN Core Services					
	Chat	Mail	Directory	Policy	PKI
	Voice	SNMP	Net-Net Mgt	NTP	3rd Party

FMN Communication Services					
	Routing	Tunneling	S-Logs	DNS	QoS
	Switching	DHCP	Firewall	IPSEC	Multicast

DCS IEG

Trusted Cloud Execution Environment			
	Trusted Linux	Trusted Hypervisor	Trusted Domain Separation

| Secure Programmable Switch Hardware	
	T2156

High Assurance

T-Router has been designed for high assurance. This is obtained by using secure qualified hardware, curated open source software with a secure process for software development. Integration and testing is performed by register-controlled personnel at Saab. The build process also allows secure hardening of configuration options to limit the attack surface.

Data plane isolation can be formally mathematically verified. Customer or government authorities may also review code and information security design as part of a certification process.

Applications

T-Router is used in solutions where you need to separate two (or more) security domains either in central solutions between operational and strategic level or at the tactcial level in various domains such as air, naval, land, space or combinations in multi-domain use cases.

Applications include data analysis for Federated Mission Networking, Airborne Early Warning sensor data networks and Information Exchange Gateways.

Airborne Early Warning

C2 Command Post

Information Exchange Gateway

Sensor Networks

Data Analysis Federated Mission Networking
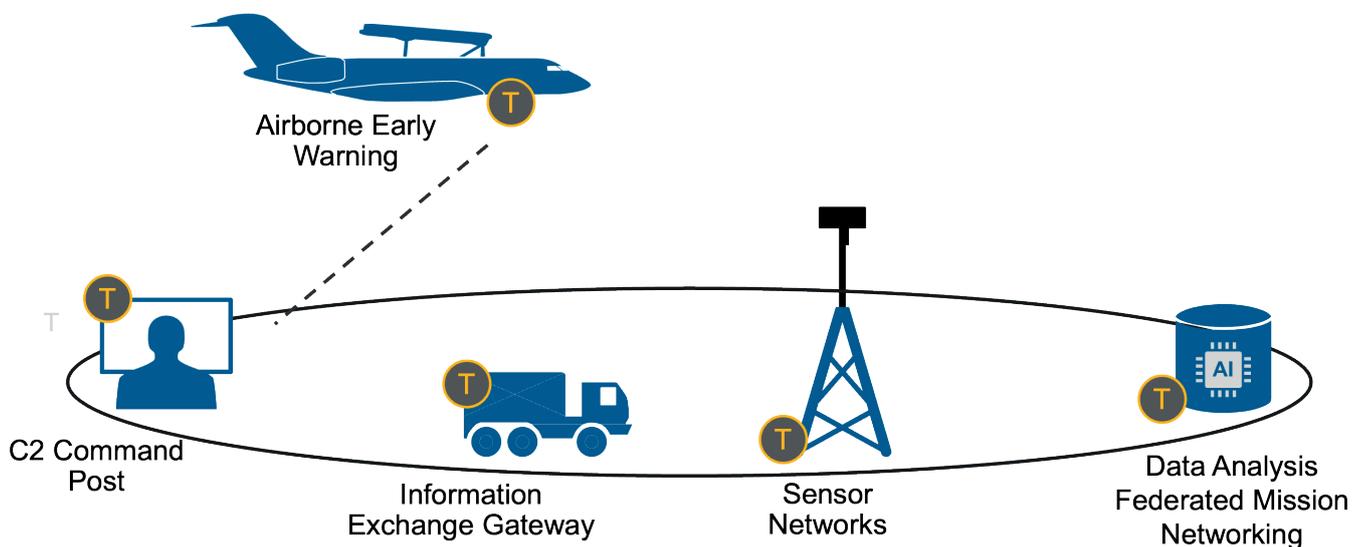
Features

Key benefits

- **Trusted Domain Separation (TDS)**
  - Multiple domains consolidated onto shared hardware
  - Robust protection against cyber attacks
  - Bi-directional protection against malware
- **Cloud-ready architecture**
- **Information security class up to NATO Secret or equivalent national security class (Svensk Hemlig)**
- **Designed for NATO and Swedish MoD requirements**

- **Hosting of data processing and collaborative services**
  - Voice, Chat and Network Data Services
  - FMN Core and communications services 'in-a-box'
- **High capacity and low latency switching**
  - Suitable for deployment at the strategic, operational and tactical levels
- **High Assurance System Design**
  - Software developed by register-controlled personnel
  - Embedded Trusted Linux and Trusted Hypervisor

Key features

- **Federated Mission Networking (FMN)**
  - FMN Core services
  - FMN Communication services
- **Hosting of FMN Core services**
  - Informal messaging (Email, SMTP)
  - Text-based Collaboration (Instant messaging, XMPP)
  - Directory Data Synchronization
  - Distributed Time (NTP)
  - Domain Naming (DNS)
  - Digital Certificates (PKI)
- **Integrated FMN Communications services**
  - Switching (Layer 2)
    - Bridging, MAC learning
    - Mirroring
    - VLAN
    - ARP
    - RSTP
    - LACP
    - 802.11x
    - PTP/NTP
  - Routing (Layer 3)
    - OSPFv2/v3
    - IGMP, Multicast
    - Static Routing
    - RIP
  - Tunneling
    - VXLAN
    - GRE
  - QoS
  - Security
    - Stateful firewall
    - IPSec
- **Management**

- REST-API, Web Mgt
- Diagnostic Logging
- Error/Warning Monitoring
- Configuration Export/Import
- SNMPv2
- Network Topology Management

- **System Security**
  - Certificate management
  - Encryption HTTPS/SSL
  - Role based login
  - Secure Syslog

- **Trusted Domain Separation (TDS)**
  - Data Plane Separation
    - Trusted LAN (T-LAN); strict port separation
  - VM isolation; all communication forced via data plane
  - Cloud Execution Environment
    - Trusted Linux
    - Trusted Hypervisor (KVM)
    - Hosting of Virtual Machines
  - IPSec encryption

Hardware specification

Model T2156

Network Ports	48x SFP28
	8x QSFP28
Max. 100Gb Ports	8
Max. 50Gb Ports	16
Max. 40Gb Ports	8
Max. 25Gb Ports	80
Max. 10Gb Ports	80
Management Port	1x 1Gb RJ45 (100/1000MB)
SDN Controller /	2x 1Gb SFP Ports
Control Plan Ports	1
Throughput	2.0 Tb/s
Switching latency	600 ns
Hot Swap PSU	2 (1+1 redundant) AC
Hot Swap Fans	6 (N+1 redundant)
Typical Power Draw	250W
Max. Power Draw	700W
Acoustics	TBD
MTBF	TBD

Other

Mil	Tempest B
Secure Boot	Yes
EC	Yes

Physical

Rack Units	1U
Dimensions (WxHxD)	46 x 4.3 x 48
Weight	Appr. 11kg
Rack Mount	Rack rail sliding solution
Hardware Warranty	3 year return to manufacturer

CPU

Intel® XEON D-1713NT (quad-core)	32GB RAM
Storage	256GB SSD
	Optional SSD (1Tb)

Power

	Options
Cooling Options	AC or DC
AC (Front to Back Cooling)	90Vac - 264Vac
AC F/B Inlet Socket	IEC 60320 C14
AC (Back to Front Cooling)	90Vac - 264Vac
AC B/F Inlet Socket	IEC 60320 C16
AC Input Frequency	47Hz - 63Hz
AC Efficiency	96%
DC (Front to Back cooling)	-72Vdc to -40Vdc
DC (Back to Front cooling)	-72Vdc to -40Vdc
DC (Front to Back cooling)	28Vdc
DC Efficiency	92%

Environment

Operating Temperature	0°C - 40°C (55°C)
Non operating Temperature	-20°C - 70°C
Humidity	5% to 95% (non-condensing)
Altitude	0 – 2000m (0 – 6000ft)

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