

SR-TRACe-G40x



Data Processing Gateway for Smart Rail Applications

- ▶ EN50155 multi-network rail computer (LTE, Wi-Fi, GNSS, Wired ETH)
- ▶ Fast and secure deployment of network-centric edge applications
- ▶ Cryptorouter/firewall protection of edge applications & IoT stacks
- ▶ Secure routing and filtering layer, with autonomous counter-measures (HIDS)
- ▶ OpCenter™ console for fleet level management of updates and settings

POSSIBILITIES START HERE

SR-TRACe-G40x

Kontron SR-TRACe-G40x edge data processing gateway uniquely combines a field-proven multi-network rail computer with SEC-Line platform, an innovative approach to delivering data-center grade processing and networking to rolling stock which answers major challenges of smart transportation projects:

Digital Independence: No vendor lock in! SR-TRACe-G40x Virtual Layer can run any existing 64bit x86 Linux based software (we mean complete stacks: OS + Applications). This allows complete freedom of choice for IoT solutions, while legacy operational software is also supported.

Security and Connectivity: Kontron SR-TRACe-G40x firmware is based on OpenWRT™ augmented with leading edge network security features. Vulnerabilities are addressed via secure updates of the encrypted firmware triggered from the fleet management console OpCenter™. This software foundation hides the complexity of low level handling for wireless and wired networks as well as routing between them. The operational software thus sees the world as a simple collection of generic TCP/IP sockets.

Tampering Detection: Kontron uses measured boot technology in the enrollment process of TRACe-40x-SR computers. This enables remote attestation, a method that can remotely detect unwanted changes made to the computer software. This SEC-Line feature implemented with OpCenter™ allows the fleet manager to discard the computer and its data and trigger physical verification of the unit.

Control and Monitoring: While IoT is all about remote monitoring of devices and processes thanks to deployed computers, most IoT stacks know very little about the underlying computer which powers them. Kontron designs SR-TRACe-G40x with an extensible monitoring engine which continuously reports to OpCenter™, allowing unparalleled granularity in the surveillance of edge computers.

Hardware Consolidation: On top of the routing and firewalling modules, SEC-Line virtualization layer allows SR-TRACe-G40x to simultaneously run existing software and modern IoT stacks in isolation of each other. This approach allows the consolidation of multiple use cases in one computer.

Security AND Agility: With Kontron SEC-Line, each actor retains its key responsibility in the deployment. OT personnel manages operational software while IT can stay in control of the network architecture and security via OpCenter™. At the same time, business applications can leverage DevOps-friendly techniques to achieve continuous deployment of modular software deep into the field.

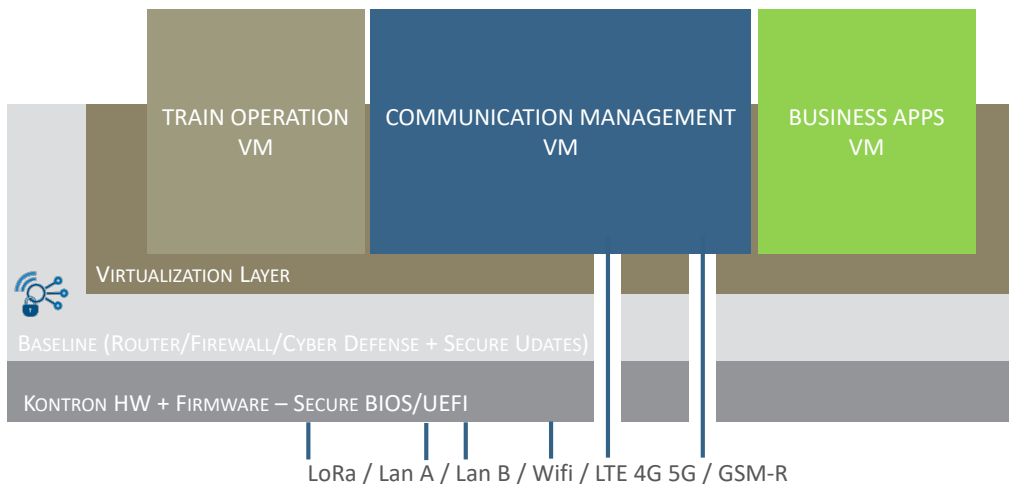
Time-to-market: Deploying existing software stacks in a computer hardware already certified for rolling stock deployments is the shortest route to success. SR-TRACe-G40x and SEC-Line allow innovative solutions to be built quickly with a much simpler code base, since security and counter measures are handled by the lower level software maintained and deployed via OpCenter™.

▶ SMART RAIL AT ITS BEST

Products leveraging Kontron SEC-Line such as SR-TRACe-G40x solve all connectivity and security problems while letting customers in complete control of their operational software and data. OpCenter allows rapid deployments, easy device cloning and replacement from within the security bubble of the customer private cloud. Continuous monitoring and remote secure updates

allow long term peace of mind for the most embedded use case deployments.

The SR-TRACe-G40x is the best starting point for new deployments aiming at FRMCS and other smart transportation initiatives. It is able to implement state of the art uCPE paradigm into rolling stock as in the following diagram



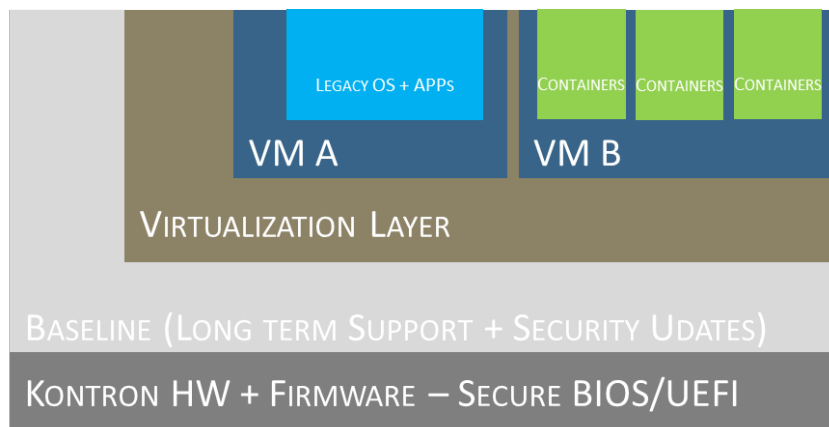
// SR-TRACe-G404 and SMART RAIL APPLICATIONS

TECHNICAL INFORMATION

ENVIRONMENT	INGRESS PROTECTION (DUST & WATER) OPERATING TEMPERATURE DIMENSIONS (W x D x H) OPTIONS STANDARDS	IP50, Optional IP54 -40 °C to +55 °C EN50155 Class OT2 by default On request : -40 °C to +70 °C +10 min@ 85°C EN50155 Class OT4/ST1 273 without ears (300 with ears) x 190 x 87 mm Additional LTE modem (dual SIM support), Insulated Digital Inputs / Outputs, up to 2x insulated RS232/422/488 EN50155 (including EN 50121-3-2, EN 61373, EN60068), EN 50155 power Class S2 (10ms holdup), EN45545-2 (Fire protection on railway vehicles), CE / FCC part 15, RoHS
COMPUTING	PROCESSORS MEMORY STORAGE	Intel® Core™ i7-6600U, Core™ i3-6100U or Intel Atom® E3940 8 GByte up to 24 GByte depending on processor 32 GByte SLC SSD, up to 8 TByte using two 2.5" drives

NETWORK AND SECURITY

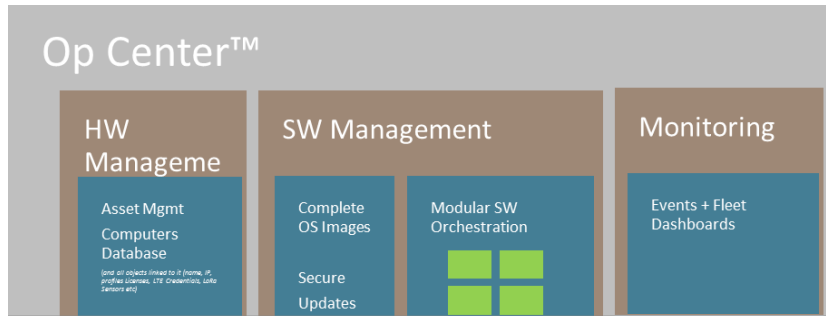
LONG RANGE NETWORKING	LTE/4G/3G	Cat. 6 modem (300 Mb/s download, 50 Mb/s upload) with DC-HSPA+ HSPA+ HSPA UMTS fallback - 2x2 MIMO support Multiple bands supported - LTE: 1,2,3,4,5,7,8,12,13,20,25,26,29,30,41 - DC-HSPA+ HSPA+ HSPA UMTS: 1,2,3,4,5,8
POSITIONING		GPS, GLONASS, BeiDou, and Galileo
SHORT RANGE NETWORKING	WIFI	IEEE802.11 ac/a/b/g/n with overall throughput up to 867 Mb/s - 2x2 MIMO support - Supports 2.4 GHz and 5 GHz bands Enhanced wireless security supporting 64/128-bits WEP, WPA, WPA2, 802.1X 2x independent Gigabit Ethernet on M12 connectors
	WIRED ETHERNET	
ROUTING/FIREWALLING	MANAGEMENT ROUTING	Based on OpenWrt last stable release managed through HTTPS, SSH and SNMPv3 All network interfaces, WiFi, 4G/LTE and ETH VLAN, bridging, firewall, load balancing, QoS, GRE, IPSec, OpenVPN...
VIRTUALISATION		Easy setup and run of Virtual Machine based on existing embedded OS (linux 64bit) or 3rd party appliances (turn key VM images)
MULTILEVEL SECURITY LAYERS	SECURE BOOT HW ROOT-OF-TRUST MEASURED BOOT CONTAINERISATION MONITORING ACCESS CONTROL HOST INTRUSION DETECTION SERVICE	Only boots Kontron signed software All passwords, encryption keys and certificates within TPM Using TPM hashing mechanism allows Remote attestation Containerisation of services with cgroup technology AppArmor restricts software to only known usage patterns, seriously limiting the impact of exploits OSSEC can autonomously reacts to intrusions detections; avoiding most brute force attempts
CONTINUOUS SECURITY	VULNERABILITY WATCH SOFTWARE UPDATES	Continuous analysis of the CVEs versus the deployed code base Functional and security patches at least once per year



// SEC-Line software running in TRACe-G40x-SR

► FLEET MANAGEMENT

OPCenter™	COMPUTER MANAGEMENT PAYLOAD MANAGEMENT HEALTH/CBIT	A single GUI which includes several tools to operate on remote computers Remote control of computers and their attached Devices / Peripherals (example LoRa devices), FW/ SW updates VM images / Containers orchestration... Computer health monitoring engine (KEHM)
CONTINUOUS SERVICE	VULNERABILITY WATCH	
		Continuous analysis of the CVEs versus the deployed code base



// OpCenter™, the SEC-Line fleet management interface, offers modular features

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