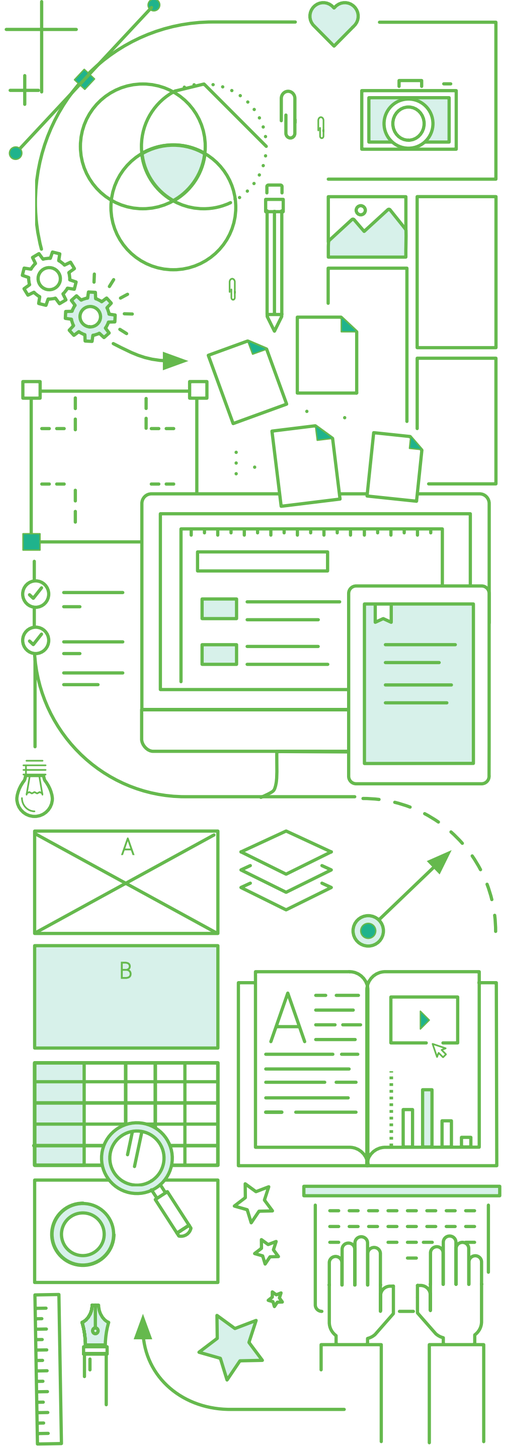
Datasheet

MontaVista

Carrier Grade Express (CGX) 4.0



MontaVista is your Linux consultant

Kernel and Userland Customization	**Customized SLAs**	**Flexible OSS & Linux Distribution**	**Custom BSPs**	**Advanced Feature Enablement**	**Performance Optimization**

Expertise

Only working on Linux since 1999 – first Pre-emptible kernel, first Carrier Grade (6-9s HA)

Supported embedded Linux in variety of markets and industries

Accelerate your schedule –Triage problems quickly, backport future features, dedicated support engineering

Reliability and Certainty

Robust Quality Assurance Testing

Frequent critical security patches and bug fixes

Board Maintenance Program (BMP) –QA performed on customer hardware

Lower Cost of Ownership

Embedded Linux distribution ready to run on SoC of choice, TODAY 10+ years maintenance

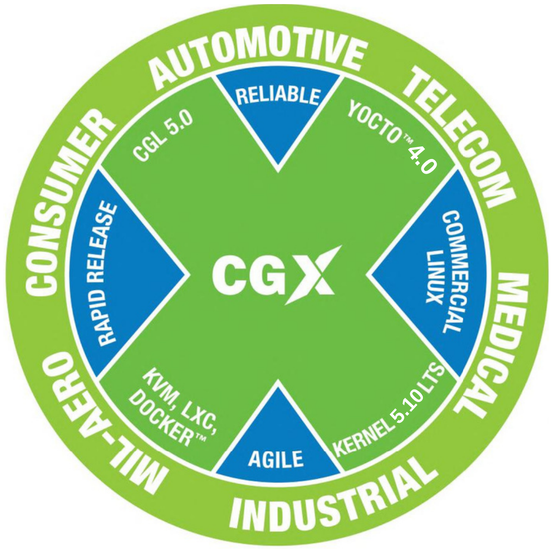
Commercial Linux at a fraction of the cost of doing yourself

MontaVista® Linux® Carrier Grade eXpress (CGX) delivers Carrier Grade Linux reliability, security, and serviceability to embedded Internet of Things (IoT) devices along with high configurability and flexibility.

MontaVista® CGX offers an all-in-one platform that meets the latest demands of interconnected smart devices, such as application portability, dynamic configuration, field maintenance, and real-time performance.

CGX enables state-of-the-art development across a wide range of intelligent devices serving markets from 5G networking and Network Function Virtualization (NFV), General Embedded (Medical, Automotive, Consumer and Industrial Control) to Internet of Things (IoT) and Mil-Aero with special purpose-built applications.

CGX complies with CGL spec version 5.0 and has achieved Common Criteria Evaluation Assurance Level 4+ certification. As a fully integrated and pretested environment, MontaVista CGX offers a truly robust out of box experience for development teams.



Reliable

MontaVista® CGX offers Carrier Grade quality enhancements of High Availability, Security, Rich Networking and IO support, RealTime response time with high throughput and Multicore and Virtualization support.

Commercial

Developers can leverage MontaVista ® CGX rich productivity tools, intensive testing and bug fixes to deliver proven quality for commercial products. Consistent updates, training, technical support, custom engineering, along with access to GPL legal expertise, and export compliance make CGX a full featured platform solution.

Agile

MontaVista® CGX enables rapid development via flexible import of custom packages, real-time enhancements, power management memory footprint optimization, and deep connectivity support.

Rapid Release

MontaVista® CGX will follow rapid release cadence to better align with latest Yocto Project® LTS releases, enabling adoption of newer Long Term Support (LTS) Kernels and Tool-chains.

Benefits

Powerful Linux Environment delivers Carrier Grade Linux reliability, security and serviceability to 5G Networks, NFV, Internet of Things (IoT) devices

Alignment with latest revisions of Yocto® Project LTS releases

Virtualization: Linux Containers (LXC), DockerTM, and KVM

Security: Secure Boot, IMA/EVM, & OP-TEE framework

Agile development with QEMU Simulator, Secure Builds, and Flexible Configuration

Rapid Release Cadence

Latest Long Term Support (LTS) Linux kernel

Prebuilt cross architecture BSPs based on ARM® and Intel ® X86 64 (Power PC and MIPS as per roadmap)

Real-Time/ Deterministic Kernel, Low Footprint Configuration, Power Management and Fast Boot

A non-unified kernel approach to reduce production cost and release cadence (unified kernel available per demand)

Carrier Grade: High availability, serviceability and long term support (10 years)

CGX 4.0

CGX 4.0 is MontaVista’s 14th generation Carrier Grade Linux.

Developer teams will have access to a supported Linux source distribution to create a wide range of embedded products and applications on x86, ARM and other SoC families.

CGX 4.0 is targeted to be Yocto 4.0 compatible with the 5.10 LTS kernel and 11.3 GCC toolchain

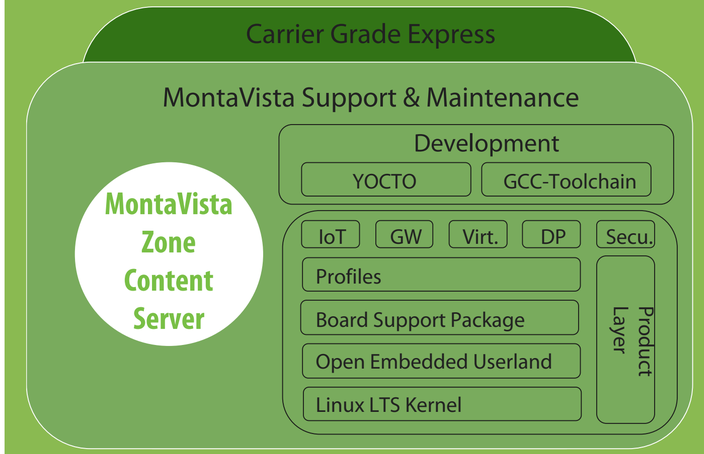
- Yocto 4.0 with Linux Long Term Support (LTS) Kernel 5.10 and GCC 11.3
- Flexible and secure OTA update tooling available MVEdge upgrade path
- Enhanced Virtualization support: KVM, Docker
- Security: Enable offline/runtime integrity management with features such as Secure Boot, SELinux, Linux IMA/EVM
- IoT Connectivity: Enablement for devices to connect the Next-generation networks, like Bluetooth Low Energy (BLE), 4G/LTE, Zigbee, LoRA, CANbus, Modbus, and Profibus
- Certification-ready Linux baseline with vetted source content and disciplined processes

Comprehensive Development Platform

MontaVista® Linux® Carrier Grade eXpress (CGX) delivers a comprehensive platform that meets product developers' needs for a truly open and fully tested solution to get an embedded device to enter the market faster. MontaVista provides risk mitigation by providing our customers with a protection from IP and patent infringement as well as full US export registration coverage for CGX.

- Linux Board Support with LTS Kernel version with Pre-integrated OE userland.
- Software Development Kit includes latest Yocto latest release with GNU toolchains.
- MontaVista Zone secure content repository.

Reducing your total cost of ownership with a fully supported, standardized Linux platform is no longer out of the question with MontaVista® CGX. The "make-or-buy" decision can be resolved: Adopting CGX is the right choice for OEMs to build a device platform as it will eliminate concerns about reliability, security, upgrades, or patches, and allow them to focus on core value-added expertise in application development.



Yocto SDK

MontaVista is a member of the Yocto Project Advisory Board as it is a productive tool for early-stage embedded Linux development.

Carrier Grade Express leverages latest stable Yocto release by building an embedded distribution. This allows MontaVista customers to take full advantage of the existing Yocto/ OpenEmbedded ecosystem with its support for added feature layers and hardware support. A profile based layered approach helps program teams with a great starting point that is both fully open as well as optimized for use cases.

Highlights

Software Development Kit

Latest Yocto build engine
Kernel & Application development tools
System measurement tools

Board Support Package (BSP)

Embedded Linux kernel device drivers & libraries userland applications CGX profiles*
**Profiles available as supported by BSP(s).*

Carrier Grade Linux

High availability
Field serviceability features additional i/o(IPMI, RAID)
CGL 5.0 compatibility
Long term support (10 years)

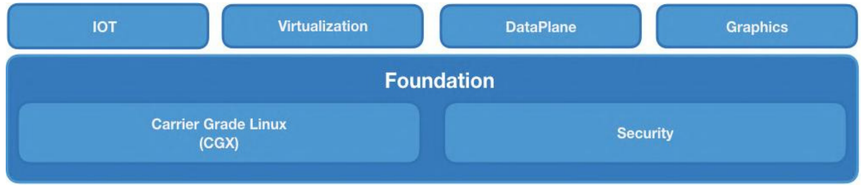
MVXpert - MontaVista Support and Professional Services

In addition to the technical values, MontaVista CGX users benefit from MontaVista's global support organization - MVXpert. The support programs can be customized to all customer's needs. This is complemented by MontaVista's world-class Engineering Services group to assist customers in building solutions to support their specific use cases ranging from portability of legacy applications to scalable KVM implementations with a real-time performance.

Moreover, the Engineering Services group can build out a full test and validation process and a long-term support and maintenance (up to 10 years) strategy to suit the requirements of any deployment strategy.

MontaVista CGX Profiles

MontaVista CGX is packaged as a base platform, known as CGX Foundation, equipped with a core feature set needed to produce a high quality embedded product. For market specific requirements, MontaVista offers additional technology profiles such as IoT and Virtualization, that add key features and functionality critical for solutions in these verticals. CGX BSP enablement is based on profiles that will be enabled depending on the target market of the board/SoC. Customers can optimize value by selecting to subscribe only required pro-files for a particular BSP.



Highlights

Professional Services

Custom BSP enablement
Performance Optimization
Customized Support programs
Very Long Term support

Targeted Profiles

Industry-specific featrures
Board target-market optimization

Foundation - Base

MontaVista® CGX is a comprehensive embedded Linux distribution that offers open source packages, development and debug tools needed to produce a high quality embedded product.

Highlights

Busybox, GNU userland tools + CLANG for Apps, btrfs, PREEMPT_RT, HRT, inux Containers (LXC), Tiny Image Config. Core Isolation, GDB, KGDB, Strace, Wireshark, Libunwind, ftrace, Valgrind, Perf, LTTng2, Libvirt, Transparent Huge Pages, Huge TLB, SNMP, Quagga, FTP, Apache2, SMART, iSCSI, NVMe, IPv4,IPv6,IPSec

Foundation - CGL

The Carrier Grade Linux (CGL) Profile has been merged with Foundation Profile and is available across all CGX-supported platforms. The packages and tools provided include features for high availability fault tolerance and serviceability.

Highlights

Live App Core Dump(LACD), Kexec/Kdump, Flight Recorder, GDB Core Dump, Ethernet bonding, DM Multipath, Hard Lockup Detector, RAID, LVM+Snapshotting, NDB, DRBD, SecureLogs, Kernel Live Patching (KGraft) SysDig & “dm-crypt”

Foundation - Security

MontaVista has worked closely with the leaders in enterprise security to create a platform that meet stringent security requirements for the network enterprise & connected device markets.

Highlights

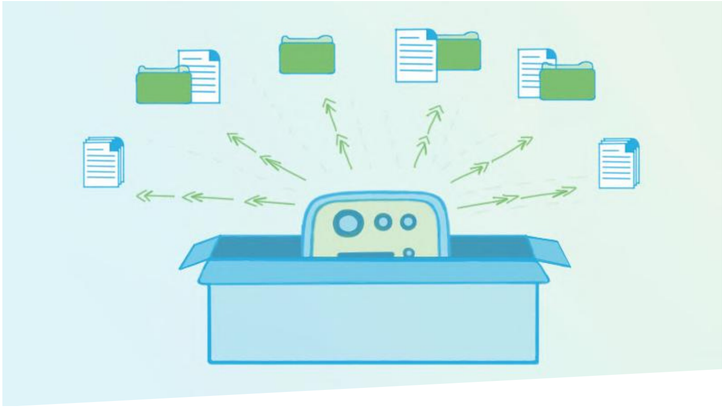
TPM 2.0, Trustzone –ARM, SELinux, ASLR/kASLR, Samhain, Auditing (Tripwire), TPM Library (TrouSers), CC EAL4+ Profile, Secure Boot, vTPM driver, MuteX W/E Pages (PaX), Linux IMA/EVM. Snort – Intrusion Detection, ClamAV – Anti-Virus

Internet of Things

The IoT Profile delivers rich features to IoT devices, including support for OpenJDK and the Lua Scripting Language. In addition, MontaVista® Professional Services engage with customers to ensure that the final product meets the connectivity, reliability and security requirements of the connected devices markets such as medical, industrial and automotive.

Dataplane

The Dataplane Profile includes important features to meet the demands of Software Defined Networks (SDN) and Network Function Virtualization (NFV) applications, including datapath acceleration via Open Datapath (ODP) and Dataplane Development Kit (DPDK), and virtual switching via Open vSwitch (OVS).



Highlights

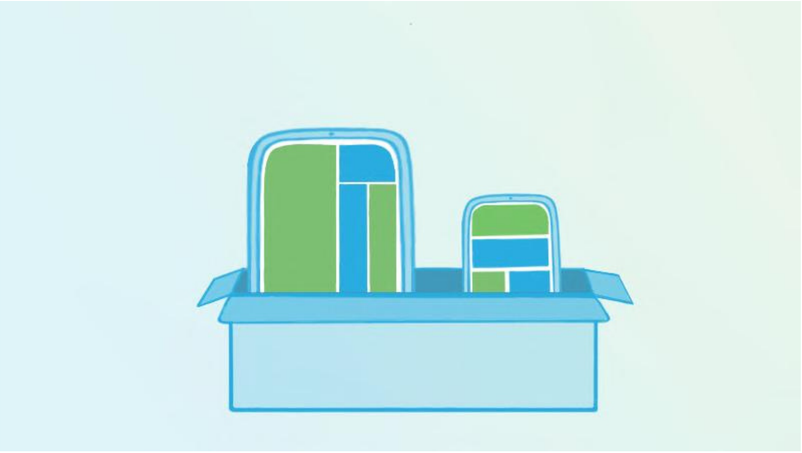
Internet of Things (IoT)

ARM mbed, Azure Client, IoTivity MQTT, AMQP, BLE, ZigBee, CAN Cell-modem - 4G/LTE, DPM, Gateway/Server API, LoRA, Modbus, OPC UA, OpenJDK, Profibus, Wifi - AP & Client

Highlights

DataPlane

Data Plane Development Kit (DPDK)
Open Data Plane (ODP)
Open Virtual Switch (OVS)

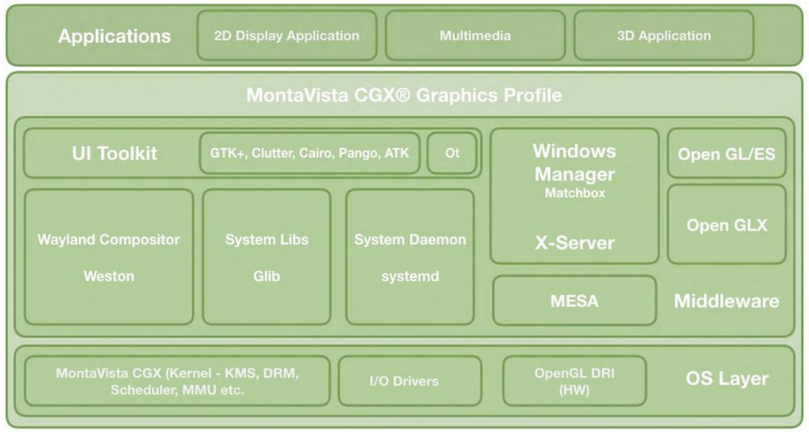


Graphics

The Open Graphics Profile provides latest graphics middleware and UI toolkits (Qt & GTK) along with reference 2D/3D applications making it easier to build customer friendly graphical user interface for medical embedded devices.

Virtualization

KVM provides a full virtualized environment for hosting multiple guest OS's. KVM allows users to partition the system into multiple OS's with maximum isolation and security. Currently available for all architectures that support KVM.



Highlights

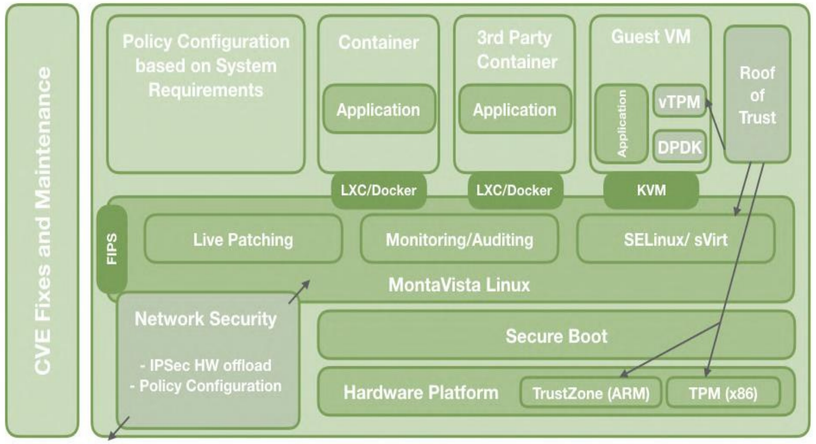
Graphics

X11
GTK+
Mesa OpenGL
Clutter
QT4/QT5 & Streamer

Highlights

Virtualization

Multicore Resource mgmt
Kernel virtual machine (KVM)
LXC containers
Docker
Virtualization tools



CGX-based Market Solutions

MontaVista® CGX is designed for versatility. As an embedded Linux solution, it helps developers deliver next generation devices ranging from core networking devices to IoT Gateways. MontaVista CGX profiles provide flexible building blocks that reduce development time, effort and risk. Some important market solutions that CGX profiles address include:

Mil-Aero with CGX

Military and Aerospace systems demand the highest level of fault tolerance with guaranteed reliability and enough serviceability features to ensure that any failures can be avoided, recorded/ logged and removed through ongoing quality improvements.

MontaVista Linux Carrier Grade Express adds additional value over open source or proprietary solutions by including features only available from MontaVista. These extra, high value features include:

- Serviceability Features – MontaVista Field Safe Application Debugger, Runtime Application Patcher, kernel crash dumps, flight recorder, live application core dump, micro state accounting, resource monitoring.
- Performance Features – real-time kernel with preemptive locks for improved latency, interrupt and preemption latency measuring tools, and application loading and locking.
- Redundancy Features – Ethernet bonding, application heart beating and fail-over, multi-hosted RAID, forced unmounted, block device removal, and DRBD.
- Networking Features – VRF, IMQ Security Features – IPSec, SELinux High Availability.
- Hardware Support – IPMI and SAForum HPI, with support for ATCA, including hot swap management.
- Standards Compatibility – PICMG xTCA, Linux Foundation CGL 5.0, LSB, IPv6 (including mobile IPv6), SA Forum, ANSI and POSIX.
- Development Tools – gcc toolchain, gdb, kdb and kgdb kernel and driver debuggers, as well as memory leak checkers, profilers, the Linux Trace Toolkit, and more.

"The continuous and broad peer-review enabled by publicly available source code supports software reliability and security efforts through the identification and elimination of defects that might otherwise go unrecognized by a more limited core development team."

(DoD 2009 OSS memo)

Medical-Automotive-Industrial with CGX

CGX meets the demands of the interconnected intelligent devices, providing application portability, dynamic configuration, field maintenance, and real-time performance in a single platform. MontaVista Linux Carrier Grade Express adds additional value over open source or proprietary solutions by including features only available from MontaVista. These extra, high value features include:

Virtualization - Native virtualization technologies like KVM, LXC/ Docker and Kubernetes (Container Orchestration) for delivering compelling Medical services as ready to use Virtual Network Functions (VNFs), applications and system software.

Security - Encryption for data at rest and in motion, integrity management, and secure boot will be a requirement to meet HIPAA laws for standards for electronic exchange, security, and privacy of patient health information.

Graphics - Open Graphics profile provides latest graphics middle-ware and UI toolkits (Qt and GTK) along with reference 2D/3D applications making it easier to build customer friendly graphical user interface for medical embedded devices.

Highlights

Mil/ Aero

Low Latency and bandwidth Content Caching
Heterogeneous Network Convergence
Radio & BBU separation
Network Slicing

Medical

Connectivity — Wired, Wireless, Serial, Cloud
Security — (Secure Boot, Root of Trust, Identity protection, Attack Prevention & Secure Update)

Automotive

Containers, Docker, KVM & Virt. Tools
Data-plane (DPDK, ODP, OVS)
Security, offline and runtime integrity management

Industrial

IoT Connectivity
Industrial Reliability
Advanced protocols and special purpose industrial use communication

Internet of Things (IoT) with CGX

Modular and standards-based solution that delivers connectivity, reliably and security needed for IoT systems.

The Internet of Things (IoT) is driving the next evolutionary step in embedded devices. From wearables and smart appliances to automobiles, more and more intelligent connected devices are being developed today. These devices require a rich set of wired/wireless connectivity options and modular frameworks that can scale rapidly for resource constrained devices with advanced security for data storage and transmission.

MontaVista® CGX's IoT profile enables delivering feature rich IoT devices with support for a wide variety of wireless and messaging protocols as well as support for IoT applications based on Java and Lua languages. In addition, MontaVista® Professional service partners with customers to meet their connectivity, reliability and security requirements for their IoT devices.

5G with CGX

5G Demands - Higher capacity, lowest latency and more consistent experience.

CGX is integral in devices that control how networks are created and behave. This is important because the next generation 5G networks are not only a new radio but also a framework to deliver 5G applications that require omnipresent scalable service delivery with highest reliability and performance.

Highlights

5G

Low Latency and bandwidth Content Caching
Heterogeneous Network Convergence
Radio & BBU separation
Network Slicing

IoT

Connectivity - Wired, Wireless, Serial, Cloud
Security - (Secure Boot, Root of Trust, Identity protection, Attack Prevention and Secure Update)

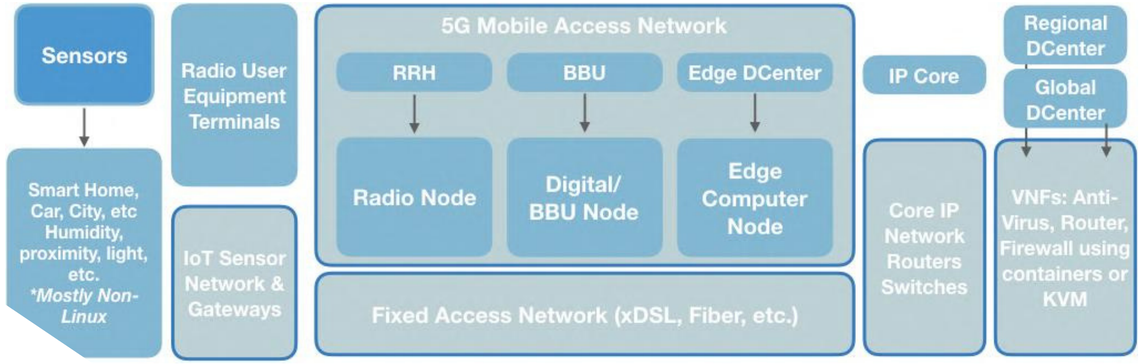
NFV with CGX

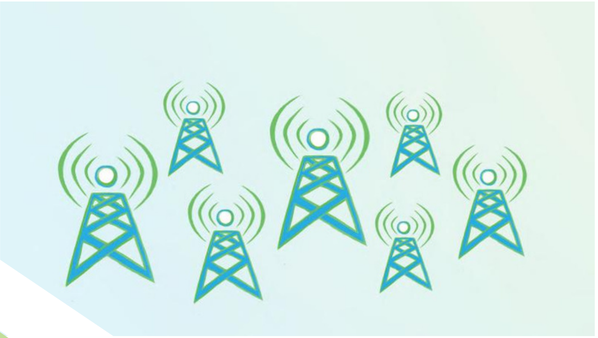
Carrier Grade Linux for Next Generation Telecom and Network Infrastructure

With the rapid increase in mobile and IoT network traffic, Network Equipment Providers (NEPs) are challenged with scaling mobile networks more efficiently than the static networks of the past. Many companies are looking for a solution where their networks can change on demand.

CGX meets the demands of the Software Defined Networks (SDN) and Network Function Virtualization (NFV), providing application portability, dynamic configuration, virtualized functions, and real-time performance in a single platform.

MontaVista products are being deployed globally in over 100 million devices, ranging from cell phones to automobiles and Carrier equipment. Our domain expertise spans the gamut from network infrastructure (high performance and high availability of long device life and support capabilities), 5G Wireless and Software Defined Networks (Virtualization, Network Function Virtualization (NFV), Security, Datapath Acceleration (ODP and DPDK), Internet of Things (Connectivity, Reliability and Security) to General Embedded.





Highlights

NFV

Containers, Docker, KVM and Virtualization Tools

Data-plane (DPDK, ODP, OVS)

SPEED by MontaVista

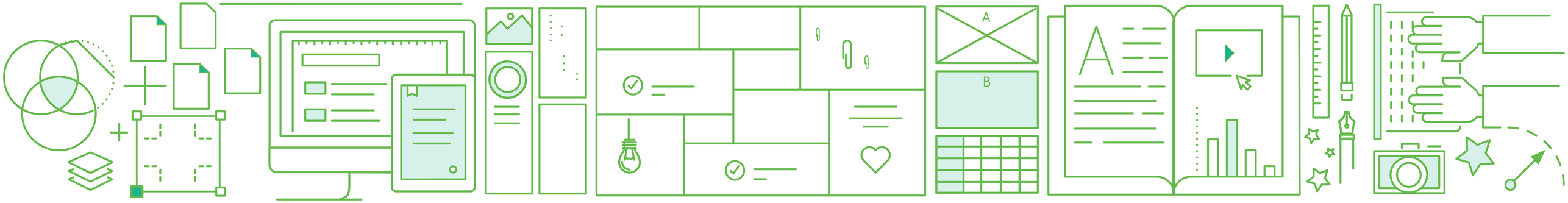
Joint hardware and software solution to reduce time to market

Dedicated point of contacts

On-going optimization through joint feedback to ensure customer success

About MontaVista Software

MontaVista Software is a leader in embedded Linux commercialization. For more than 20 years, MontaVista has been helping embedded developers get the most out of open source by adding commercial quality, integration, hardware enablement, expert support, and the resources of the MontaVista development community.



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