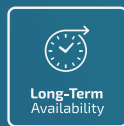


Kontron Transportation

vDCR

Virtual Data Center for Railway Applications
Private Cloud Platform for Mission Critical Communication
Solutions



The Initial Step Towards 5G and FRMCS

by introducing
container
technology

Pre-Integrated Services

included for the
needs of the
transportation
industry

New Operation/ Maintenance Landscape

for more efficient
operation and
deployment
processes

Security- Enforced Configuration

in all levels of the
architecture

Provides Consolidation Opportunity

of datacenter
resources

Fully Compatible with the Existing GSM-R Ecosystem



Virtual Data Center for Railways

In today's dynamic IT environment, the railways industry players are seeking solutions that provides the expected stable foundation for the legacy application while supports the introduction of the new technology that are the requirement of taking the giant leap from GSM-R to FRMCS. The vDCR private cloud platform is engineered to provide robust performance with great efficiency and scalability, while maintaining the control and security of the on-premises infrastructure.

Kontron Transportation vDCR application platform built on the cloud-native technology provides the perfect balance, offering a dedicated, secure IT environment tailored to the specific needs of railways industry.

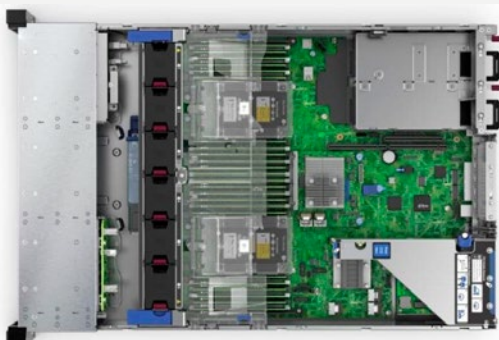
With vDCR you can:

- › Gain unparalleled control and security over your data and applications
- › Leverage the elasticity and scalability of the cloud to meet changing demands
- › Optimize IT costs and resource utilization
- › Simplify the management processes and reduce operational overhead
- › Perform smooth technology shift from 2G (GSM-R) to 5G (FRMCS)

vDCR is the ideal platform for organizations that prioritize data sovereignty, regulatory compliance, and highest levels of security. The migration of existing workloads supported by the "rehost" strategy that is considered to be the most efficient approach when dealing with legacy application.

Security Features

- › Centralized identity and access management
- › Encryption used in every layer of the data storage
- › Defense-in-dept
- › Setup using a restricted air gapped (no public internet access required) environment
- › Increased observability
- › Rolling in-service upgrades allow deploying the latest security updates



Rack-Based Servers as the HW Foundation

- › Redundant chassis components
- › Hot pluggable components
- › Fully managed - alerts are sent on any failure
- › 2 socket motherboard, processor based on Intel x86 CPU architecture
- › Duplicated network interface cards and connections
- › Long-life HW elements are chosen
- › Carefully dimensioned to meet environmental requirement

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Active Security Management via RedHat Advanced Cluster Security

- › Real-time Threat identification with enriched context
- › Network policy navigation to master the complexity of SDN
- › Increased Health & Performance Observability
- › Ensure confidentiality after decommissioning
- › Enables Early intervention for various issues



vDCR Platform Advantages

Efficiency improvements	Building on container architecture provides the ultimate efficiency gains and flexibility.
Migration options for applications	All strategies for migrating legacy applications are valid; Choices for minimal efforts or going for full benefits of new tech can be called.
Security features	Built on a vertically Integrated fully hardened configuration. Implementation of defense-in depth approach.
Operation and maintenance	New OAM tools provide better observability via access to additional information in an up-to-date manner.
Software-defined infrastructure	Software defined storage and networking is built-in to provide flexibility and more efficient use of resources.
Easy integration to the environment	Internal network implementation is based on the service concept that can efficiently hide internal complexity and simplify the integration burden.
Professional services	Availability of highly skilled personnel to help finding the most efficient solutions in complex scenarios.

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Solution Level Redundancy

The platform architecture uses built-in internal redundancy with an RedHat OpenShift 3 server compact cluster setup. With this approach, the system can tolerate the loss of one element in any situation as the dimensioning of system resources are prepared in a way that the capacity of the 2-node cluster can handle the expected load.

OpenShift's High Availability is a configuration to support running all the solution components without a single point of failure. Kubernetes is deployed in a Cluster setup that provides inherent resiliency and scalability when using multiple nodes as the computing platform.

Increased service availability of the hosted application payload is achieved by automatic restarts of the failed virtual instance/container without any external intervention or coordination.

Support for Consolidation and Evolution

The unique hybrid container and virtualized machines platform based on the Kubevirt technology allows seamless migration of the legacy applications to the new environment, while boosting the introduction of new solution elements required for the evolution of the communication core. From legacy management applications, towards IMS and MCX servers for the next generation as well as 5G core NFs can run in the same environment.

Advanced OAM Features

Kontron Transportation's management Solution CarrierNMS is already integrated to the platform. Access network management is also provided by the same platform, making the solution a unified supervision center. Additional components can be integrated via various standard management protocols like SNMP, REST, Webhooks or application protocol-based service monitoring.

Centralized customer and service data handling is provided by the Evolved Railway Provisioning Manager (eRPM), that is also hosted on the same platform.

Prometheus server as a central monitoring element in the RedHat OpenShift cloud platform plays the most important role in the O&M assurance workflows (fault and performance management). Prometheus is a standard monitoring application for recording and processing time-series data and handling thresholds for alerting. Using this performance management server provides good visibility on every component of the complete solution deployed on the platform.

For application and platform management the OpenShift Web console is provided, that displays the health information of the container orchestration engine as the software platform of the vDCR solution.

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vDCR Platform Centralized services

Platform-integrated services represent the most important strengths of the vDCR solution. The summary of the benefits for the implemented centralized services is provided below.

Central Database Service

Consolidation of the database services in a cluster-based centralized solution provides ultimate flexibility and manageability, while optimizing the resource requirements and performance. By removing the administration complexity, Issues can be more easily identified, and solutions can be delivered much sooner.

Central Identity and Access Management

The users, their credentials and access rights are stored in a central place according to the latest cybersecurity recommendations. This instantly gives simplified user experience, streamlined administration via reduced complexity, increased compliance with regulations and enhanced visibility and control.

Central Log Management

Consolidating log information in a central place is an important cybersecurity requirement to enable observability/traceability of complex IT solutions. Moving logs out of the source system also provides protection against compromised data on nodes that suffered an attack or failure.

Central Backup and Restore

Fully automated backup-restoration operation for the platform components and applications is provided by the enterprise grade central service implemented in vDCR as a foundation of modern and efficient datacenter management practice.

Key Features

- › vDCR is a pre-integrated application platform
- › Paves the way for 5G and FRMCS
- › Fully backwards compatible with GSM-R solutions
- › Smooth and efficient way of datacenter transformation
- › Brings new advanced OAM processes
- › Offers improved security compliance
- › Integrated services offer consolidation opportunities
- › Future-proof investment into next-gen datacenter technology
- › Private cloud concepts preserve full-control of data

Virtual Data Center for Railways

About Kontron Transportation

Kontron Transportation is a leading global supplier of end-to-end communication solutions for mission-critical networks. With a longstanding focus on the railway sector, the company specializes in systems that produce, transport, and process voice, data, and video — reliably, securely, sustainably, and efficiently.

Its portfolio includes GSM-R, FRMCS (Future Railway Mobile Communication System), MCx (mission-critical services, including MCx OTT) with IWF (interworking functions), as well as enhanced radio solutions, private 4G/5G mobile networks, transmission networks, and cybersecurity solutions. Kontron Transportation also serves other mission-critical industries with tailored

communication solutions and offers mobility products such as validators and fare collection systems for public transport operators.

For more than 30 years, the company has helped shape railway communications and continues to drive the evolution of broadband communication solutions for mission-critical networks, for instance as an associated member of Europe's Rail Joint Undertaking (EU-Rail), making it the perfect partner for FRMCS.

The company has more than 700 employees, operates 11 sites across Europe, and is headquartered in Vienna.

Kontron Transportation is part of the Kontron Group.

Kontron Transportation GmbH

Lehrbachgasse 11
1120 Vienna, Austria
Tel.: + 43 1 25 33 700
kta_office@kontron.com

www.kontron.com/kontron-transportation



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The Power of IoT