C3 Call Controller

Ribbon C3 Call Controller is a multi-application call server and media resource/media gateway controller, deployed globally by leading communications service providers. Virtual C3 delivers superior value and deployment flexibility, leveraging KVM Virtual Machines (VMs) to enable C3 software to run on a variety of commercial off-the-shelf servers (COTS).

Ribbon offers Virtual C3 for all new deployments and upgrades. Existing C3 customers should take steps to migrate off older, appliance-based, rack mount servers (such as IA-RMS) which are end-of-support. Virtualization assures more COTS server choices for years to come, while lowering upgrade and operational costs. Service providers can select server hardware that best matches their brand preference and performance goals. They can source qualified servers themselves or from Ribbon.

Virtual C3 Overview

Virtual C3 call controller is the product of more than two decades of intelligent design and service innovation. It is a versatile platform that provides service convergence and feature transparency across a wide range of wireless and wireline networks.

Virtual C3 enables robust services for the most demanding service environments including comprehensive routing, translations, screening, database interface (e.g., LCR, toll free, prepaid), media gateway control, and protocol interworking. It supports commonly used regulatory functions such as Lawful Intercept, Emergency Call Routing, and Number Portability.

The protocol-independent signaling and media control functions are agnostic to outgoing facilities and signaling types, and manage the interworking between IP to IP, IP to TDM, and TDM to TDM protocols.

C3 to Virtual C3 Migration

Virtual C3, deployed using KVM Virtual Machines (VMs), offers in-service migration from existing C3 appliances to the virtualized configuration; available with Release 26 or later. This enables service providers to completely modernize the implementation and decommission of legacy servers.

Multiple C3 VM instances can run on a single server pair, improving deployment density, and minimizing capital expenses. Virtual C3 can be deployed globally in a wide variety of network environments, allowing providers to better leverage spares and employee skillsets across their network.

High Capacity, Scalability and Geo Redundancy

The highly scalable Virtual C3 supports millions of Busy Hour Call Attempts (BHCA), yet can scale down to smaller configurations, as needed. Service providers can grow capacity as needed, by provisioning additional VM pairs, enabling cost-effective network expansion. Virtual C3 is deployed on NEBS-compliant servers and can run in a geo-redundant configuration to ensure best-in-class reliability and service continuity. In such a configuration, Virtual C3 is designed to sustain multiple faults, temporary site failures, or even complete site destruction without losing capacity or billing data; all while maintaining calls.

Cost Efficiency

- Flexibility to run on a variety of rackmount servers, either Ribbon or customer-provided
- Sustains other legacy elements of an existing network, enabling gradual migration to a modern network architecture
- Greatly reduced power and real estate footprint vs. comparable TDM alternatives
- Integrated functions and services to reduce operational complexity and cost
- High density and capacity with rapid scaling, for optimal cost per subscriber

Transcoding/Media Resource Processing

Working in conjunction with Ribbon's G9 Converged Gateway, Virtual C3 is a media resource controller or IMS MRFC that enables direct IP to IP transcoding between networks. Leveraging the G9's extensive wireless/wireline codec support and SIP interfaces, Virtual C3 acts as a centralized transcoding control platform for all networks. This allows physical separation or decoupling of media resource controls from the media processing elements. This centralization allows transcoding resources to be efficiently sized and scaled according to network needs.

Management: Virtual C3 EMS

- OSMINE Certified
- Full FCAPS functionality
- Extensive performance monitoring and network diagnostics.
- User-friendly GUI and CLI, SSHV2
- Multi-VM management
- Northbound interface: SNMP, CLI, TCP/IP, Telnet, FTP
- Supports any configuration – TDM, or IP (IPDR, SDR)
- Highly Scalable – support of up to one hundred clients
- Client is platform-agnostic
- Provisioned as a dedicated VM pair

Call Processing Performance Characteristics

- Up to 1M BHCA per call processing VM pair
- Up to 15M BHCA per C3 system (cluster)

Platform

Server Hardware Specifications

- Ribbon provided NEBS-compliant Dell PowerEdge R740 servers
- Customer provided servers that meet the minimum requirement for Ribbon's Virtual C3application:
  - Dual Intel Xeon Gold 5218 2.3GHz or better
  - Minimum of 3 x 2 port Intel NIC's - 1 GbE or 10 GbE
  - Minimum of 1.2TB Redundant Storage
  - Minimum of 192 GB Memory
- Up to 16 VM pairs per system (1 EMS VM pair + up to 15 Call Processing VM pairs)

Host Server Software Specifications

- RHEL Release 8.5 or higher

Supported Deployment Models

- Data Center
- Multiple C3 Virtual machines can run on a single server
- Servers deployed in pairs for 1+1 redundancy
- The first server pair must be configured with the EMS VM
- Additional Call Processing VMs may reside on the first server pair or on subsequent pairs as required

C3 VM type	Dell Base Server from Ribbon (VMs per server)	Dell Large Server from Ribbon (VMs per server)	Redundancy
C3 EMS	1 VM	1VM	1+1
C3 Call Processing	1 VM with EMS 4 VMs without EMS	3 VMs with EMS 5 VMs without EMS	1+1

Key Advantages

- Integrated media gateway controller/(MGCF), media resource controller/(MRFC) signaling gateway, application server, billing server and element management system
- Advanced transit and routing services enabling replacement or augmentation of legacy TDM Class 4 infrastructures
- International gateway and VoIP termination support
- Proven, carrier-grade reliability on a fully redundant architecture with no single point of failure
- Geographic redundancy – Deploy geo redundant VM's in different data centers
- Service development and management is available via an on-board service creation environment, INAP and AIN triggers and SIP
- Trunking and signaling protocols include SIP, SIP-T, SIP-I, H.248, MEGACO, BICC, PRI, H.323, GR-317, GR-394, GR- 444, CAS/R2, T.140
- Supports multiple SS7 protocols including ANSI, ITU, ETSI and multiple national C7 protocols, for ISUP and TCAP
- Supports variable CDR for any-to-any billing format conversion as well as AMA-BAF

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