ORACLE

Oracle Communications Convergent Charging Controller (OC3C)

While much focus has moved to monetizing 4G and 5G networks, traditional 2G-3G networks will remain important and operational for many years to come. However, communications service providers (CSPs) have deployed multiple service control point (SCP) silos to support their SS7-based IN services over the years which are still deployed today, often resulting in escalating operational expenditure and increased risk of end of vendor support.

Consolidate, modernize, and monetize SS7-based IN services

As a key module within Oracle's Cloud Scale Charging and Billing solution, Oracle Communications Convergent Charging Controller (OC3C) is an advanced Service Control Point (SCP) to improve customer experience with online charging control of enhanced voice and SMS services, self-care offerings, and SS7-based IN services. OC3C also provides a sophisticated Voucher Management (VOMS) solution. These capabilities allow CSPs to consolidate and modernize traditional IN silos onto a single cost-efficient platform while being assured of their continued support as they pivot towards the 5G future. Recent Release 15 innovations further enhance notifications, voucher operations, monitoring, reliability, auditing/traceability, security/compliance, and platform modernization (e.g., Java 21, Helidon 4.x, and updated database/runtime certifications).

OC3C is being used by multiple CSPs in a variety of markets and geographies with proven scalability ranging from 100,000 to more than 50 million subscribers with seamless invest as you grow capacity planning models.

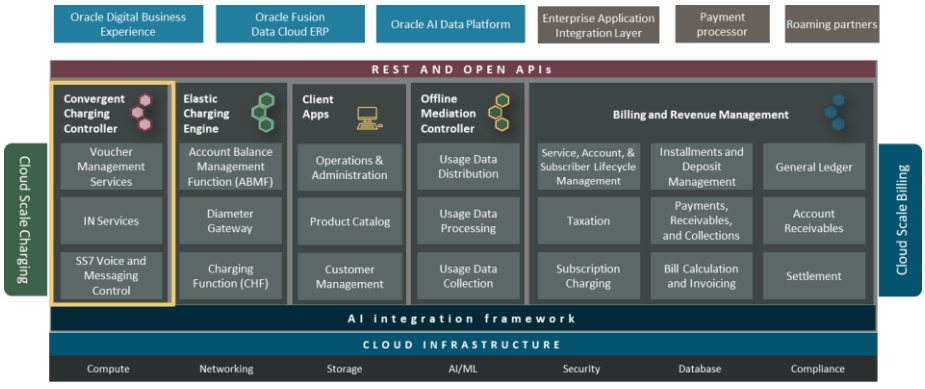

Image 1. OC3C provides the functions circled in yellow within Oracle's Cloud Scale Charging and Billing solution.

"We needed to transform our online charging capabilities while consolidating legacy systems and reducing costs. Oracle's Converged Charging System provides us with critical, rapid monetization of innovative prepaid commercial offers and an evolution path to meet future requirements."

Sedin Kahriman
General Manager
BH Telecom

Key benefits

Oracle Communications Convergent Charging Controller (OC3C) provides an advanced Service Control Point which enables CSPs to consolidate, modernize and monetize SS7-based IN services:

- Improve customer experience with enhanced voice, SMS & self-care offerings.
- Configure and deliver notifications that are relevant, timely and highly personalized.
- Reduce OPEX by consolidating traditional IN silos onto a single cost-efficient platform.
- Grow revenue with vouchers that stimulate usage and shape subscriber behavior.
- Harness industry standard observability tooling such as Kafka, Prometheus, Grafana and the EFK stack.

Improve customer experience with advanced online charging control of voice and messaging services

OC3C provides online charging control for voice and messaging services for both prepaid and postpaid subscribers. Voice charging control works by requesting fund authorization until rejection (fund exhaustion) with mid-session commits with each authorization. Event and messaging charging control works using both reserve and confirm and direct methodologies.

OC3C supports traditional SS7 network control using productized control agents as shown in table 1 and custom control agents can be easily built with the OC3C SDK.

VOICE	CONTROL AGENT	MESSAGING	CONTROL AGENT
Fixed	ISUP, INAP, SIP	GSM	MAP, CAP, SIP, SMPP
GSM/UMA	ISUP, CAP, SIP	CDMA	IS-826
CDMA	IS-41, IS-826, ISUP		

Table 1. Voice and messaging control agents supported out of the box by OC3C.

Service configuration agility

OC3C provides a service configuration environment with a graphical and workflow-based representation of all service and charging control logic. Using the control plan editor, it is easy to incorporate additional logic into the call flow such as to play low balance announcements, divert to menus using an IVR or send notifications such as AOC (advice of charge).

Using "drag and drop" configuration of production ready building blocks, as shown in Figure 2, the underlying complexities of the logic being executed disappear, allowing internal personnel to create, validate, modify, and maintain innovative services with streamlined and intuitive service creation attributes. It also provides an open Web 2.0 framework to rapidly leverage an external ecosystem enabling existing services to be integrated and new enhanced services to be delivered.

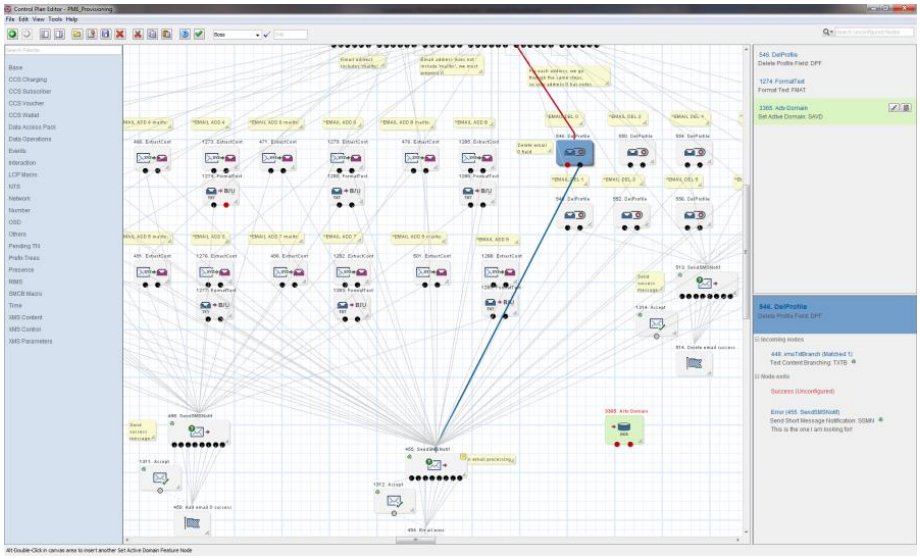

Image 3. The control plan editor provides a drag and drop service configuration environment

Key features

- Voice online charging control for fixed, GSM/USM and CDMA mobile networks (ISUP, IAP, SIP, IS-41, IS-826, ISUP)
- Messaging online charging control for GSM and CDMA networks (MAP, CAP, SIP, SMPP, IS-826)
- Integrated self-care, number routing and IN services
- Drag and drop service configuration with Open Web 2.0 framework and SDK
- Voucher management services

Recent release 15 innovations

- **Early call forwarding:** support FTN (Forwarded-to Number) from HLR to correctly forward calls to the C-party.
- **Voice MO calls:** added SIP INVITE parameter support (NPDI and RN).
- **Voucher operations:** generate voucher batches via the Provisioning Interface.
- **Notifications:** increased SMS notification size and added segmentation for larger notification messages.
- **Monitoring:** enhanced system monitoring support.
- **Reliability:** improved DAP2 feature node handling for timeout scenarios.
- **Auditing/traceability:** unique transaction IDs for on-demand voucher creation.
- **Reporting:** additional attributes included in voucher reports.
- **Security/compliance:** product security upgrades and updated compliance/certifications.
- **Platform & compatibility:** modernized/updated technology stack and certifications (Java 21, Helidon 4.x, OL9 runtime, Oracle DB 19.25; updated third-party dependency matrix including Oracle DB 23.26 / "26ai").

Define advanced self-care structures that enhance customer experience and reduce call center interactions

OC3C supports all traditional self-care mechanisms such as IVR, USSD, SMS and web. Self-care menus with real-time queries and account management are designed with the control plan editor, and the structure can be applied to any channel. Sample capabilities include:

- Play or send CCS account and balance information via IVR.
- Deliver advice of charge and service configuration from CCS.
- Add / modify data in CCS. Update 3rd party data with SOAP interfaces.
- Voucher redemption. Purchase an offer or bundle.
- Subscribe to additional services.

Deliver notifications that are relevant, timely and highly personalized

OC3C provides the important role of notifications gateway within Oracle's Cloud Scale Charging and Billing solution. OC3C can consume notifications generated from across the system through both JMS and Kafka, and is then used to design personalized notification experiences. For example, the balance and profile information can be inserted into a notification template where the surrounding wording can be defined for the notification.

Using the flexibility of the control plan editor, notifications can be configured to be sent at any point in the service logic such as when a balance depletes below a certain level triggering a low balance warning to be sent in real-time.

It is also possible to define the delivery mechanism according to any logic such as location or subscriber preference whether that be any combination of USSD, SMS, email, web, or mobile self-care app as part of a modern digital experience. Controls can be put in place for when the notification should be delivered, such as at specific times of the day, or according to subscriber preferences such as a late shift worker selecting not to receive notifications during the day when they would typically be asleep. These collective capabilities and much more provide Oracle's Cloud Scale Charging and Billing customers with flexibility to configure personalized and relevant notifications as part of a modern customer experience.

Reduce OPEX by consolidating traditional IN silos onto a single cost-efficient platform

As a SCP which provides online charging control and self-care services for traditional SS7-based networks, OC3C also allows the consolidation of traditional IN silos onto a single platform providing extreme performance with minimal hardware footprint to deliver exceptionally low total cost of ownership.

OC3C provides originating and terminating number routing services enabling service providers to optimize costs whilst also complying to regulatory compliance.

- Least cost routing enables service providers to optimize routing over different carriers based upon analysis of the incoming call parameters – the route is identified by the Network Routing Prefix (NRP), with the routing algorithm

Control plan editor

- Workflow-based representation of all service and charging control logic.
- Configure call routing rules, IVR handling rules and call completion rules.
- Graphical, drag & drop configuration by non-specialist service creation engineers.
- Operational readiness with 250+ proven service logic building blocks.
- High operational productivity with streamlined user workflows.
- Advanced service validation with connection diagnosis and logic tracing.
- Web 2.0 framework provides rapid integration of inbound and outbound 3rd party services.
- SDK allows OC3C to be enhanced and extended using product plug-ins for service management, network integration and service logic.

Advanced self-care

- Early call forwarding: support FTN (Forwarded-to Number) from HLR to correctly forward calls to the C-party.
- Voice using IVR and direct dial (CAP2/3, INAP CS 1).
- Web for recharging via a payment gateway or retailer / ATM (SOAP, XML).
- Messaging for both SMS – payload and keyword extraction and USSD one shot / menu (USSD, MAP).

capable of being defined by multiple parameters such as day, time of day, protocol, calling party number, calling party category and dialed number.

- Number portability (NP) supports various forms including All Call Query (ACQ), Query on Release (QoR), and Onward Routing (OR) and can be adapted to suit each service providers exact needs.
- Electronic number mapping (ENUM) using optimized routing over different carriers with shared ENUM DBs using both Private and Carrier ENUM. This provides an important extension to number portability.
- Service numbers can be rapidly configured with OC3C such as free phone, toll free, premium rate services, and tele-voting. These continue to provide powerful sales and marketing tools.
- Essential services can easily be implemented such as emergency services with location support, carrier [pre]-select, and universal access numbers (voice, video, email, fax, and SMS).
- VPN provides private network facilities across a public telephony network with support for company specific service logic across on-net and off-net calling and call termination. The service also supports rapid creation and easy management of end user VPN services.

OC3C also provides a range of message processing and routing capabilities that can be used to both increase revenue and protect subscribers from fraud:

- Express SMS delivery enables direct SMS delivery to the handset for person to application (P2A) and application to person (A2P) messaging. This means the SMS does not need to be delivered via an SMSC, presenting a cost-saving for the service provider through reduced SMSC licenses. Multiple alternate routing attempts and delivery reports are also both supported.
- The SMS anti-fraud service enables subscribers to be protected from fraudulent SMS attacks, with a whole range of capabilities such as anti-fraud screening, spamming, spoofing, faking, flooding and database pumping.
- SMS home routing gateway increases the home network SMS revenue by intercepting roaming SMS traffic and terminating it back on the home network.

Voucher management solution (VOMS) to grow revenue, stimulate usage and shape subscriber behavior

OC3C offers a comprehensive voucher lifecycle and redemption solution. Sophisticated voucher management capabilities allow the creation of personalized recharge programs that shape subscriber behavior and stimulate usage with any combination of personalized features such as redemption of multiple balances with individual expiration policies, user selected scenarios from a single voucher, and date based incentives. Release 15 also improves voucher operations and governance with provisioning-interface voucher batch generation, unique transaction IDs for on-demand voucher creation, and enhanced voucher reporting attributes.

The voucher management capabilities also provide enhanced security and increased level of fraud prevention that includes encryption of sensitive, voucher-related data,

Notification gateway

- Consume CCS generated notifications through JMS/Kafka.
- Convert into SMS, USSD or email for delivery to subscriber.
- Enrich based on template definition and subscriber preferences.
- Separate control flows for each event type.

Number routing services

- Least cost routing
- Number portability
- ENUM
- Service numbers
- Essential services
- VPN

Message processing and routing services

- Express SMS delivery
- SMS anti-fraud
- SMS home routing gateway

Voucher and recharge management

- Any balance type, any quantity
- Multiple Balances & Expirations
- Date Based Incentives
- Voucher Generation and Distribution
- Voucher revenue assurance
- Enhanced security and data encryption (SHA-2, SHA-512 and SHA-256)
- Flexible business process and integration flow
- Comprehensive and full voucher lifecycle management

Secure Hashing Algorithm 2 (SHA-2), SHA-512 and SHA-256 Hashing for voucher HRN (Human Readable Number).

Highly efficient, extreme performance

OC3C is a highly efficient and carrier grade platform engineered to optimally work on x86 servers with Oracle Linux (including OL9 runtime certifications) or Oracle SPARC T-Series servers with Solaris, providing extreme performance with minimal hardware footprint to deliver exceptionally low total cost of ownership. The productized platform also provides horizontal and vertical scalability, full geographical redundancy, disaster recovery and provides fast access to new features using business aware upgrades.

Harness industry standard observability tooling

OC3C allows simplified operations, better observability, and a real-time operational view. It supports monitoring using Prometheus for metrics collection and Grafana to create and explore system-wide data through flexible dashboards. Enhanced system monitoring support in Release 15 further simplifies operations and improves real-time visibility.

Summary

Oracle Communications Convergent Charging Controller (OC3C) is a highly scalable Service Control Point (SCP) to improve customer experience with online charging control of enhanced voice and SMS services, self-care offerings, and SS7-based IN services. OC3C also provides a sophisticated Voucher Management (VOMS) solution.

Together, these capabilities allow CSPs to consolidate and modernize traditional IN silos onto a single cost-efficient platform while being assured of their continued support as they pivot towards the 5G future. It empowers CSPs to create “customer-personalized” profitable services from a single platform. It eliminates multiple inefficient silos and helps to dramatically reduce the ongoing cost of operations.

High availability model with full disaster recovery options

Service Management System

- Multiple Balances & Expirations
- The DB for all subscriber and service data
- Except the subscriber's wallets and prepaid vouchers
- 2N Clustered architecture / DR options available

Voucher Server

- Voucher database and redemption
- 2N mated pair architecture (active/hot standby)
- Transaction data synched between active and standby
- Fail-over transactions can complete on the standby node

Service Logic Controller

- Hosts the service logic and network interfaces
- Active/active N+1 redundant architecture
- Traffic is load-shared across all nodes

Related solutions

OC3C is an integrated component of Oracle Cloud Scale Charging.