

A service delivery platform  
for next generation  
telecommunication services



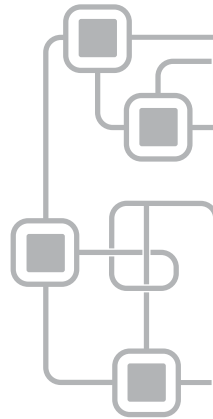
OpenCloud formed in New Zealand in 2000, to create open standards-based software technology that would revolutionise the creation of telecommunication services. The goals were service agility, innovation, portability and price / performance for both TDM / SS7 and IP-based networks.

OpenCloud's expanding network of partners and application developers deliver, integrate and support end-to-end solutions to network operators and service providers worldwide.

Over **30** of the world's leading  
telecom operators rely on OpenCloud's  
Rhino Telecom Application Server

# CHALLENGES

Over 90% of telco's revenues today are generated by telecom voice, messaging and data connectivity services – services that are, to a large extent, provided by legacy Service Control Points (SCP).

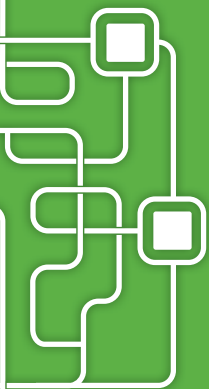


## **Commonly referred to as the Intelligent Network**

(IN) platform, these high cost systems were not built to meet the dynamic nature of today's highly competitive market. They are simple, static one-size-fits-all solutions, built on expensive proprietary platforms unable to offer the levels of service agility, innovation or cost-per-subscriber served the industry now demands.

This is a problem; basic voice is becoming commoditised with increasingly large all-you-can-eat bundles putting pressure on operators to differentiate through the delivery of a new generation of premium voice, data and content

services. With the increasing power of mobile end user devices, Operators must utilise their position in the service delivery chain to add value with their network and supporting infrastructure and so differentiate their offering from over-the-top providers and other Network Operators alike. Operators, application developers and Network Equipment Providers will need to develop new and innovative services that utilise voice, messaging and data – plus the associated customer knowledge they have, such as location, presence and personal preferences – as key 'enabling' components.



## So, what are the next steps?

While innovation and new service delivery are vital to gain competitive advantage, today's fiercely competitive market also demands operators deliver more and more service for the same or less money.

### **To compete effectively and to maintain good margins**

on declining ARPU levels, operators need to identify and deploy new user inspiring and revenue generating services in more targeted and innovative ways. And they must do so at dramatically lower CAPEX and OPEX price-points.

The OPEX of legacy Service Control Points is often so high that it can be used to fund the CAPEX for more innovative next generation IN application platforms and services, while slashing ongoing OPEX and establishing a roadmap to a new generation of voice, messaging and data based services.

These next generation platforms utilise standards-based, commercial-off-the-shelf (COTS) hardware and software delivering a new level of service layer agility at a radically lower price-point. This addresses the challenge of reducing CAPEX and OPEX, while assuring greater competition and lower costs from a host of third party application and service providers no longer locked-out or constrained by proprietary infrastructures and restrictive business models.

To directly address these challenges of today's SS7/TDM and IP networks, and unlock the true value of the network service layer, OpenCloud has developed an open, java standards-based service execution environment – OpenCloud Rhino.

# THE SOLUTION

OpenCloud's Rhino™ is a real-time Telecom Application Server for agile development, deployment and efficient management of classic and telco 2.0 telecommunication services.

It can be used to develop and deploy carrier-grade applications that use SS7-based protocols such as INAP and CAP, IP protocols such as SIP and Diameter, and IT / Web protocols, such as HTTP Servlet, XML and Service Orientated Architectures (SOA). OpenCloud Rhino provides a fault tolerant infrastructure that delivers continuous availability, low-latency service execution that delivers five nines availability during network outages, hardware failure, software failure and routine maintenance operations such as services

and platform upgrades. OpenCloud Rhino is a clustered system which is managed online as a 'single image' to minimise operator procedures and eliminate cluster configuration faults.

In addition to the Telecom Application Server, the OpenCloud Rhino suite consists of a suite of optional add-on software product components, professional services, comprehensive deployment and support services and an industry leading developer programme.

## FAST INTEGRATION, SERVICE DEVELOPMENT AND DELIVERY



### The Java™ Difference

**The open flexibility and power** of Java is being adopted in the telecoms network – enabling the smooth integration of ‘write-once, deploy many times’ applications.

### JAIN SLEE

JAIN SLEE is the Java standard for SLEE (Service Logic Execution Environment).

JAIN SLEE (or JSLEE), is the telecom network equivalent of Java Enterprise Edition (JEE). It ensures complete interoperability, irrespective of the underlying network technology. The result; fast integration and even faster service development and delivery.

JAIN SLEE is designed specifically to allow implementations of the standard to meet the

stringent requirements of network signalling telecommunications applications.

The JAIN SLEE specification is also designed for implementations to achieve scalability, throughput and resilience to failure.

JAIN SLEE specifies server software capabilities that provide common behaviour to all services. This means that common ‘system-level’ behaviour is not re-developed for each and every service. There is a clear separation between the service (or application) and facilities that are the standard features of the platform.



# THE POWER OF RHINO

## **BASED ON AN INDUSTRY STANDARD**

Rhino is based on an agreed standard for an Application Server that meets the specific needs of telecommunications networks.

**CARRIER-GRADE** OpenCloud Rhino is a truly carrier-grade Telecom Application Server (TAS). Rhino is a low-latency execution platform expressly designed for the exacting requirements of the telecommunications signalling network. It provides a high performance, no-single point of failure, 'five nines availability' platform for telecommunication services. Rhino also provides continuous availability of active 'in-flight' service sessions on failure. The runtime environment is self-monitoring, protected from overload and self-healing. Rhino is a clustered server, administered as a 'single image' using its in-built operations and management capabilities.

## **COMMERCIAL-OFF-THE-SHELF PLATFORM**

OpenCloud Rhino utilises standard server technology in a carrier-grade configuration. It harnesses the scalability and power of today's server technology. It brings Moore's law into the service layer, delivering unparalleled price/ performance to the Service Control Function (SCF, in 3GPP parlance).

**AGILE SERVICE CREATION** OpenCloud Rhino is designed for a world where telecommunications operators deliver a wide range of targeted services to their customers. Where they seek to innovate and deliver services that are aimed at the specific needs of different customer segments. A world of fast prototyping and beta-release of services, and where external companies can contribute to the service portfolio, rather than simply delivering standard utilitarian telecom services.

**NETWORK INDEPENDENCE** Rhino's programming model provides a large degree of network independence for the application developer, whilst recognising and embracing the reality of telecom networks as multi-protocol environments. Rhino and the JAIN SLEE standard provide a 'pluggable' architecture for connecting to different networks (the 'Resource Adaptor' [RA] architecture). RAs provide a Java API to the full capabilities of the underlying networks and protocols. Developers can write services that fully utilise the network capabilities. And services can be readily ported from one protocol to another with the minimum of change using different RAs.

**CONVERGED SERVICES** Rhino supports multiple network technologies concurrently, using the network-integration layer providing the means to create genuinely converged services, which can run across multiple network technologies simultaneously. This offers significant revenue growth opportunities, and provides an evolutionary means to migrate smoothly from a legacy network infrastructure to an IP-based infrastructure.

# OpenCloud's Rhino Telecom Application Server delivers significant benefits

**NETWORK MIGRATION** Cost-effective migration from one network technology to another is an extremely complex and costly exercise for telecommunication operators. As Rhino provides a generic, horizontal signalling platform across many protocols, independent of the network technology, it is the ideal enabler technology for smooth transition between networks. Rhino provides the bridge between networks, to make the services of one network available to another network, and to move network users from one network to another in a gradual, incremental fashion.

**GLOBAL NETWORK – GLOBAL SERVICES**

Telecom operators are global entities, often put together from businesses that have grown organically, often over many years. They commonly have a myriad of network equipment providers, technologies and service platforms. To address this diversity, Rhino can support multiple networks and protocols concurrently, including variants of the same protocol (such as vendor-specific versions of INAP). Rhino can be used across disparate networks, thereby supporting cost-effective global service or global-branded applications.

**ROBUST AND RELIABLE** Rhino enforces a transactional programming model, where the JSLEE application developer automatically 'inherits' and makes transparent use of the native capabilities of a well defined failure model, when they deploy their application on Rhino or another JSLEE compliant platform.

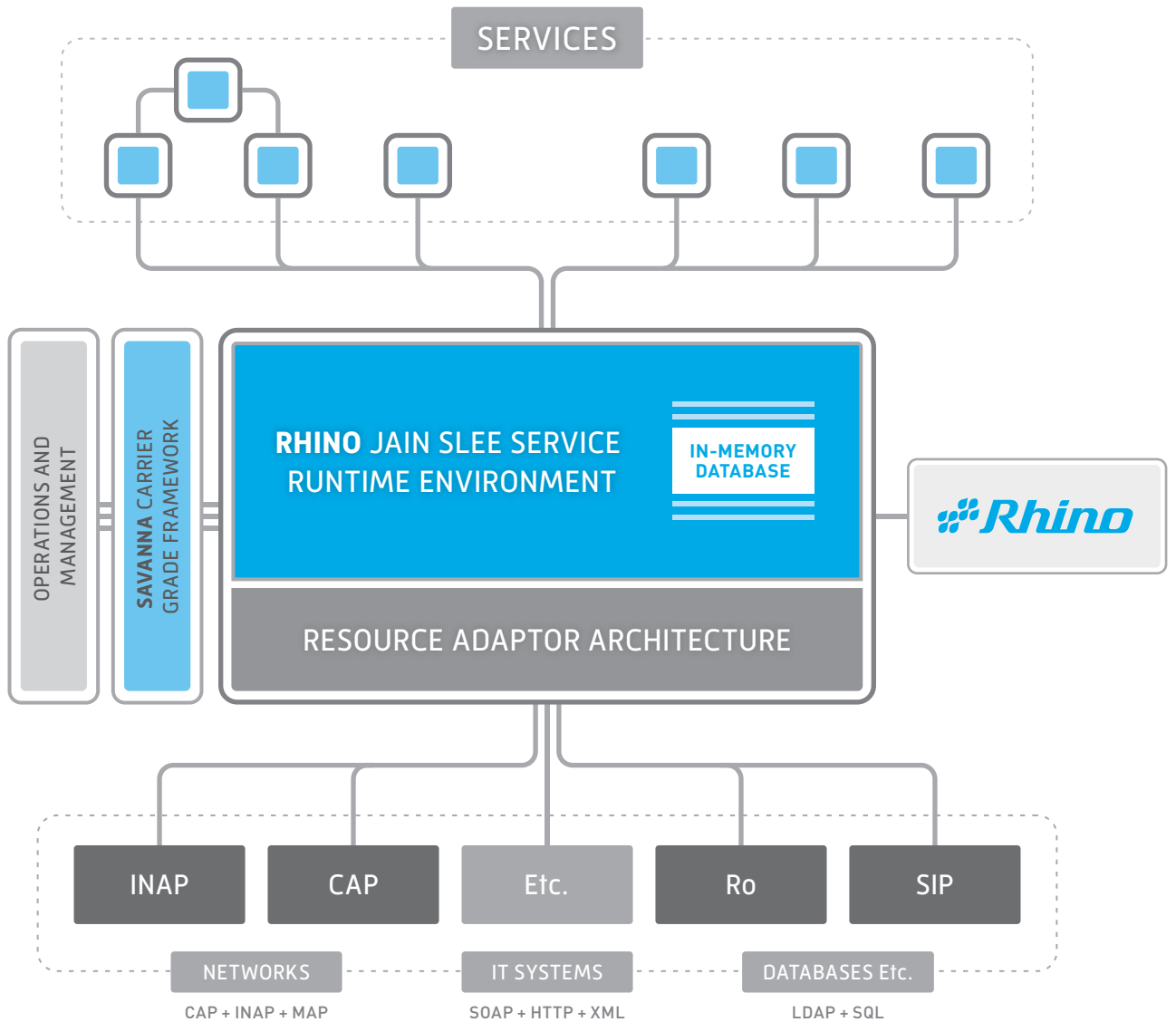
**STANDARD OBJECT-ORIENTATED COMPONENT ARCHITECTURE**

JSLEE facilitates the design and structuring of application logic as a collection of reusable object-orientated components. This increases productivity and reduces errors. Components can be composed into higher-level richer services, by leveraging what has already been built and proven to work.

**INTEGRATION CAPABILITY** Resource Adaptors (RAs) provide integration capabilities using an extensible plug-in architecture known as the 'Resource Adaptor Architecture'. RAs provide interconnection with the 'outside' world, for example, interfaces to communication protocol stacks, directory services or external systems (such as rating and billing). RAs are portable between JSLEE telecom application servers – so an application and its RAs can be moved from one fully compliant JSLEE to another, without any need for any re-coding or porting.

**MANAGEMENT CAPABILITIES** A key feature of OpenCloud's Rhino is that it is managed as a single system image, regardless of the number of physical servers that are used. This significantly reduces the management overhead for deployment and change control and directly impacts OPEX.





OpenCloud is proud to be helping some of the world's largest and fastest growing operators to provide innovative telecommunication services

# CORE PORTFOLIO

The OpenCloud product portfolio comprises three interlocking products. These are all based on the same core Rhino technology. In addition, there are a number of additional software product options. The three interlocking products are:

- Rhino Telecom Application Server™ (TAS)
- Rhino Service Interaction Server™ (SIS)
- Rhino Charging Sentinel™

## Connectivity Packs

Connectivity Packs provide additional, optional interface functionality for the OpenCloud Rhino Telecom Application Server.

These packs offer a comprehensive set of Resource Adaptors (RA). RAs provide connectivity from Rhino to/from other equipment, such as other network elements, or IT systems. Rhino Connectivity Packs implement protocols such as SIP and Diameter in IP networks, CAMEL, INAP and a large selection of vendor variants for SS7 networks and SOAP, HTTP, LDAP and SQL in the IT domain.

## Rhino Service Interaction Server

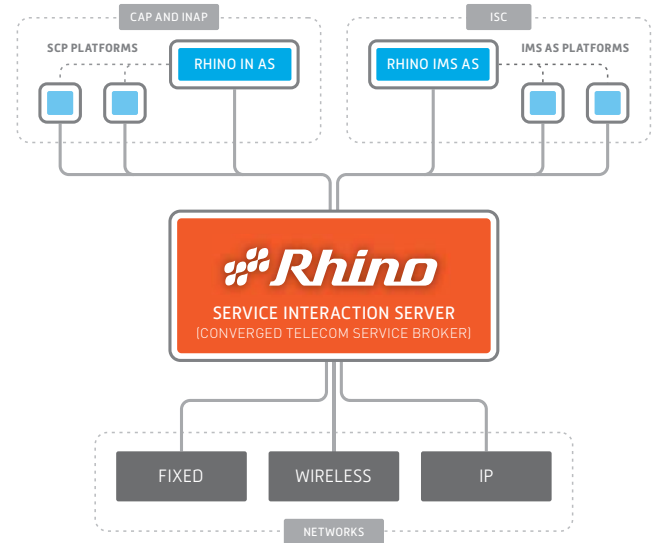
The Rhino Service Interaction Server (SIS) is a fully-featured, totally convergent Telecom Service Broker. Rhino SIS provides service composition and interaction functionality which allows operators to compose new services from their existing SS7 and IP services. Rhino SIS allows variant services to be created – using a graphical user interface – from existing services, whether they are IN, IMS or hybrids. Rhino SIS also optionally provides IM-SSF and R-IM-SSF functionality.

*Service Composition and Service Interaction are commonly referred to as "SCIM" when discussing IP or IMS networks. For TDM SS7 networks, the terms "Service Broking" and Trigger Interaction Management (TRIM) are also used. The OpenCloud Rhino SIS performs these functions – for both IP and SS7 networks and also for mixed or hybrid situations.*

The Rhino Telecom Application Server is the foundation stone of all OpenCloud's product offerings.

## Rhino SIS allows the user to:

- Create service interaction 'scripts' to compose a new service from several existing services using a drag/drop Graphical User Interface. Such service compositions can involve any application, network service, or protocol – hosted remotely on a SCP or TAS or locally on an OpenCloud Rhino TAS.
- Separate the interaction logic (executed in the SIS) from the service code (executed on the SCP or TAS).
- Combine multiple independent services (including a combination of SCP, 3rd-party IMS Telecom Application Server (TAS) and Rhino TAS-hosted services) to form new services that have not been possible in the past – simply by using a GUI to define the composition. No change to the existing service is required.
- Manage service interaction by isolating and controlling new services.
- Orchestrate the signalling to 'pre-pay-enable' services that have no in-built on-line charging capability.
- Rhino SIS provides interaction capabilities for TDM/SS7 IN protocols such as INAP and CAMEL and for IMS networks with SIP.



### **RHINO IM-SSF (SERVICE SWITCHING FUNCTION) TRANSLATOR**

is an optional add-on to the Rhino SIS. It provides interworking between the IMS domain and the IN Services Environment. With Rhino IM-SSF operators can provide IMS users with transparent access to existing IN services via an interface between the IMS network and the CAMEL service environment (CSE) used in 2G mobile networks. By providing such cross-network access, operators can migrate subscribers to IMS without the need to have a full portfolio of services available in the IMS network. Combined IN / SIP service compositions can be created when using the IM-SSF option in the Rhino SIS.

### **RHINO R-IM-SSF (REVERSE IM-SSF) TRANSLATOR**

is the counter-part to the IM-SSF option. Unlike the IM-SSF the Rhino R-IM-SSF is not specified in the IMS architecture but naturally complements it by providing connectivity and access to services in the opposite direction. Therefore, operators do not have to replicate all the existing services again in the IMS network in order to meet customer's needs. Service compositions that utilise the services hosted on the IP network can be created when using the Rhino R-IM-SSF.

# THE ECOSYSTEM

OpenCloud's ecosystem of partners and ISV's provides a wide range of applications for the Rhino platform for classic telecom and telco 2.0 services.

This ecosystem provides the environment to drive widespread innovation around the Rhino platform. For the first time in telecoms, third party developers can build genuinely portable applications. OpenCloud Rhino provides a pluggable, standards-based Resource Adaptor interface that allows connectivity between the Telecom Application Server and the outside world – be it to the telecommunication network for example, location servers, directory services such as LDAP, databases or other IT systems.

Such applications include; Converged IP-PBX, IP-Centrex, Virtual Private Networks (VPN), real-time texting, personalised ring back tones, advertisement sponsored calling, personalised call control rules, prepaid service call control, multiple numbers per device, call control and call continuity, online charging mediation and real-time charging.

---

## Developer Tools

OpenCloud's developer portal boasts a large and growing community of Java developers building telecom services. The portal provides a federated Service Creation Environment (SCE): OpenCloud service development and testing tools, OpenCloud Rhino product data, for example, benchmarks and recommended configurations, training, how-to-guides, technical support, whitepapers, FAQs and developer resources.

## Professional Services

OpenCloud offers specialised consulting, implementation, training and 24 x 7 support for customers and partners.

## Complete Solutions

OpenCloud is working with a global ecosystem of partners and developers to build, deliver, integrate and support end-to-end solutions for global network operators and service providers.

OpenCloud Rhino is available direct or through selected partners.

# SUMMARY

## ADDRESSING YOUR CHALLENGES

REGAIN CONTROL OF  
YOUR SERVICE ROADMAP

REDUCE THE COST  
OF INNOVATION

ELIMINATE  
LEGACY BARRIERS

**NEW SERVICE REVENUE** Achieve competitive differentiation by rapidly introducing smart telco services.

**'SMART' INNOVATION** IN augmentation enables innovation in the core telecom services, while the OpenCloud Telecom Application Server supports access to 'smart' next generation services and ultimately switches off the high cost legacy IN platform.

**MARKET SEGMENTATION** Segment your market and deliver targeted services; in turn, this helps increase customer loyalty while decreasing churn and time-to-market.

**REDUCE OPEX** Achieve rapid innovation, deployment, integration and ease of administration, while reducing the support burden on the network operations team.

**COST CONTAINMENT** Open interfaces means you don't have to decommission and replace; co-existence with your current Network Equipment Provider to evolve new applications without accruing additional costs.

**COTS** Commercial-off-the-shelf commodity hardware and software eliminates NG-IN and IN rigidities and restrictions, dramatically reducing costs, and ensuring radically lower price-points.

**TRANSFORM THE SERVICE LAYER**

Break down legacy barriers imposed by proprietary equipment vendors and deliver an agile and low cost development environment in the service layer.

**STAYING OPEN** Open up your service layer to a host of telecom service developers, to rapidly deliver innovative new services to market. Fully convergent: an open platform which fully supports IP protocols, standard and vendor variants of all SS7 signalling protocols.

**MAXIMIZE EXISTING VALUE** The delivery of an open, scalable platform that integrates with both open and proprietary infrastructures enables innovation whilst deriving maximum value from existing assets.

## For further information

### OPENCLOUD LTD (HQ)

Edinburgh House  
St John's Innovation Park  
Cowley Road  
Cambridge CB4 0DS  
United Kingdom

TEL: +44 1223 395 611

FAX: +44 1223 223 021

### OPENCLOUD NZ LTD

Level 5  
Sovereign House  
34 Manners Street  
P O Box 606  
Wellington 6011  
New Zealand

TEL: +64 (0)4 498 0069

FAX: +64 (0)4 385 2794

### WEBSITES

[www.opencloud.com](http://www.opencloud.com)

<http://developer.opencloud.com>

### EMAIL

[info@opencloud.com](mailto:info@opencloud.com)

### MEDIA ENQUIRIES

[pr@opencloud.com](mailto:pr@opencloud.com)

[www.opencloud.com](http://www.opencloud.com)