Telsis
A Gamma company

Ocean Services Platform

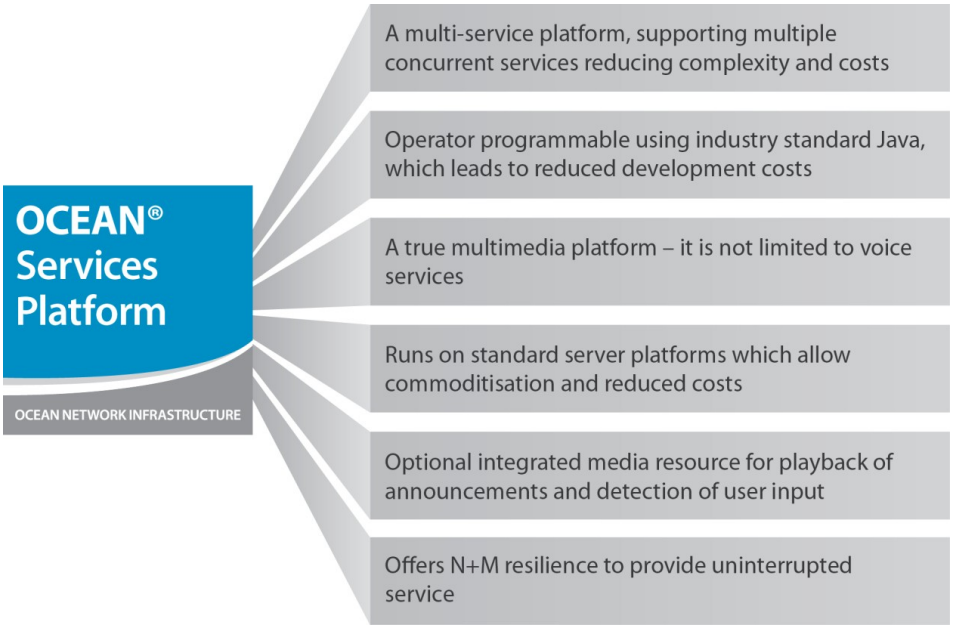
Product Description Release 4

Contents

1. Introduction

The Telsis Ocean Services Platform is the latest in a long line of Telsis programmable, multi-service platforms that give Network Operators the power to rapidly create and deploy new services across next- generation and legacy networks, enabling them to target key business areas, including user retention, increased revenues, or cost reduction.

Based around proven technology that is already used in a number of networks and working alongside softswitches and SIP proxies from a variety of vendors, the Ocean Services Platform provides a platform for rapid, telephony-service development and deployment.



The Ocean Services Platform can support signalling for use in next-generation networks, and simultaneously control devices in TDM networks via INAP/CAP as well as directly integrating with Telsis' Ocean 2280 IN Application Server, providing seamless migration of existing services, and reducing the effort required during migration.

In the next-generation network domain, the Ocean Services Platform offers the service designer full control over the signalling and media paths, including the ability to step in and out of the media path during the call. This capability provides the greatest levels of flexibility, while minimising the network resources required for services – thus reducing costs.

Services developed on the Ocean Services Platform can communicate with external databases or other external resources using standard Java APIs. This enables the Ocean Services Platform to interwork with other network devices to optimise call routing, for example, interworking with network ACD systems to provide intelligent call routing as part of an overall customer care solution.

As any Network Operator would expect from a mission-critical platform, the Ocean Services Platform can offer availability greater than 99.999% (based on recommended hardware or virtualised resource). The Ocean Services Platform operates with a safe runtime environment that delivers support for stable services.

The Ocean Services Platform supports an optional industry-standard Java Service Creation toolkit development Environment (SCE) that enables Network Operators or third parties to rapidly develop and deploy new services. These services may then be deployed across next-generation networks and, optionally, legacy TDM networks, providing consistent services to all customers, regardless of how they connect to the network. A set of sample services is supplied in both executable and source code form; these can be adapted by service developers to meet customer-specific requirements. This puts control in the hands of the network operator, with no need for any supplier intervention.

Telsis and its approved partners also offer service-design consultancy services to assist in the development and deployment of new services.

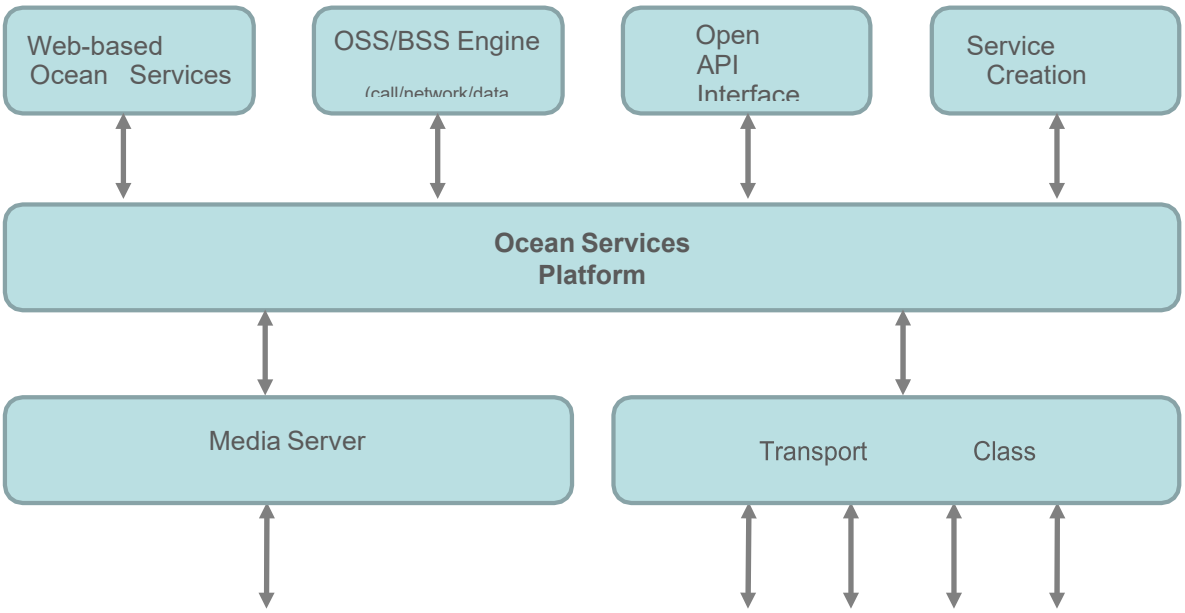
The management environment provides a real-time view of system activity and alarm conditions. The management interface is designed for simplicity, making it easy to use and minimising training costs.

2. Specifications

Service capacity	Up to 5 000 Java-based services Supports Java classes for common service features 10 000 service assignments (based on SIP call setup parameters or service keys)
Traffic capacity	Up to 50 000 call setups per second (service-dependent, licensed in units of 100, subject to hardware limitations) Up to 100 000 simultaneous calls (licensed in units of 1 000)
Service data	Up to 100 million records of control data available for use by services running on the platform, for example, number translation rules Resilient, distributed storage for data associated with each instance of each service Access to unlimited, service-related data stored in external databases
Database support	Java APIs for integration with external databases Diameter Sh interface to Home Subscriber Server (option)
Sample services	Sample Services Pack including: Service Numbers Local Number Portability Least-Cost Routing A-Party Authentication
Service creation toolkit (option)	Java Service Creation toolkit development Environment integrated into an industry-standard toolkit (option)
Service management	Live service updates Ocean Service Manager (option)
Resilience	N+M resilience for scalable performance and availability beyond 99.999% (based on recommended hardware or virtualised resource) Automatic failover Managed shutdown and restart Optional service separation for service security
Operations and management	Alarms management via Simple Network Management Protocol (SNMP) Configuration and performance management via web-based Operational Support System Syslog fault diagnostics
Legacy service support	Includes virtual Ocean 2280 IN Application Server, which allows legacy services to be used during system migration
Signalling protocol support	SIP Adapter SS7 INAP/CAP SIGTRAN Adapter (option) SS7 MAP SIGTRAN Adapter (option) DNS ENUM Adapter (option) OCP Adapter for Execution Engine interworking with legacy products OCP Adapter for Ocean 2280 interworking with SIP and the Ocean Media Server (option)
Media control	Ocean Media Server (option) Supports call-session record and monitor, announcements and keypress detection
Accounting	Supports Diameter Ro and Rf billing interfaces with optional mediation to other formats The SIP Adapter optionally can provide Telsis Ocean 2010 SSP format CDRs for legacy services compatibility

3. Architecture

The Ocean Services Platform is a programmable, multi-service next-generation network platform that can also support legacy TDM networks.



The Ocean Services Platform supports a number of flexible deployment options. It may be deployed in an N+M configuration – where N instances are required for capacity, and M instances provide resilience.

The Ocean Services Platform may be installed either on dedicated servers, as part of a data centre (where the platform is run on general server infrastructure), or in the cloud, where the processing and storage are virtualised.

All the Ocean Services Platform's services are managed through the Execution Engine which a) controls calls via the Transport Class Adapters (TCA) and b) interfaces with the Media Server, Ocean Services Manager and Analytics Engine.

In addition, the Ocean Services Platform provides a distributed, scalable, redundant environment for developing service flows; these services are implemented using an optional Java-based Service Creation toolkit development Environment (SCE) that can be self-programmed by the network operator.

The Execution Engine manages calls by first processing incoming messages sent to it (via a TCA) by external network entities (e.g. a SIP proxy server, an SS7 INAP/CAP SIGTRAN-enabled switch or a session border controller), then generating commands instructing the adapters how to handle the calls. The instructions it issues may require it to access information from an external database using SQL queries.

This architecture allows Network Operators to implement sophisticated services involving intelligent call routing (such as Service Numbers, Least Cost Routing and Indirect Access), a host of IP capabilities, and Number Portability. It also provides the performance required to high call volume events, such as mass calling televotes.

The Ocean Services Platform also supports Ocean 2280 compatibility mode, which runs services developed on the Ocean 2280 IN Application Server.

An optional OCP Adapter is available for Ocean 2280 interworking with SIP and the Ocean Media Server. This provides an upgrade path to next-generation for users of legacy Telsis platforms, such as the Ocean 2010 SSP. It also allows the Ocean Services Platform Execution Engine to interwork with legacy Telsis platforms, such as the Ocean 2010 Service Switching Point and the Ocean 2281 INAP Interface.

Services can be migrated from legacy to next generation networks in a controlled manner reducing the risk of service interruption, and the costs associated with ‘big-bang’ upgrades, where all services are switched over to a new platform at the same time.

The optional Ocean Service Manager System licence provides an external service configuration and service statistics machine to machine interface for a Network Operator’s web portal or CRM system. An optional Ocean Service Manager Base Web Application licence is also available, which provides a base set of web pages that may be built upon to provide a Network Operator specific web interface to end users.

4. Call Routing

4.1. Service Selection

Services may be selected on a call-by-call basis (that is, on a per-session basis) using one of the available received parameters.

The parameters that can be used to select services depend on the signalling protocol in each case. The parameters available for use are:

SIP	REQUEST Header TO Header FROM Header The defined address may include wildcards in any TEL URIs, SIP URI user part or SIP URI domain part.
INAP/CAP (Option)	Called Number Calling Number Service key Wildcards and prefixes are supported in the Called and Calling Numbers

4.2. Service-dependent routing

Within a service, routing decisions are entirely flexible and can be made using any field available. Dependent on the signalling protocol, the following signalling fields are available to the service:

SIP	All received headers SDP content
INAP/CAP (Option)	Called Number Calling Number Called Number Type and Plan Service Key Calling Party Category Original Called Party ID Location Number Forward Call Indicators EventTypeBCSM Redirecting Party ID Redirection Information Additional Calling Party Number

4.3. Next-generation network operating modes

When operating in a next-generation network, the Ocean Services Platform can operate in any of the following modes:

Redirect Server

Non-Record-Route Proxy

Back-To-Back User Agent (B2BUA)

The operating mode is selectable on a session-by-session basis from within the services.

In the Redirect Server mode, the Ocean Services Platform responds to the SIP Invite with a 302 Redirect containing the new destination as provided by the relevant service. The Ocean Services Platform takes no further part in the session following this response.

The Non-Record-Route proxy mode is a non-standard SIP operating mode specifically intended for compatibility with NSN IMS systems. In this mode, the Ocean Services Platform acts as a proxy for the duration of the SIP Invite method, but never adds itself to the Record-Route header. Once the SIP Invite method is completed (in simple terms the call has been answered and the 200 responses exchanged), the Ocean Services Platform takes no further part in controlling the session.

In the B2BUA mode, the Ocean Services Platform also remains in the call-control path. However, in B2BUA mode, the Ocean Services Platform has more control over the session, allowing the session to be controlled beyond the BYE method for the first destination. The Ocean Services Platform supports RFC3725 call flow 4 to provide Third-Party Call Control.

4.4. Typical operation

The Ocean Services Platform can provide a common service across multiple network technologies. This means that one service can be used to route SIP sessions and INAP calls. A typical scenario is number translation for service numbers, with no follow-on actions once the number has been translated. In the following example, a number translation service is assigned to a service number.

4.4.1. Typical operation in a next-generation network

When the Ocean Services Platform receives the INVITE from the preceding proxy or softswitch, it matches the service number in the REQUEST header and triggers the number translation service.

The service sends a query for the service number to a database and the database returns the full destination number.

The Ocean Services Platform returns a 302 (Moved Temporarily) response to the INVITE, which contains the address returned by the database as the new contact address.

The proxy (or softswitch) receiving the 302 response sends an ACK to the Ocean Services Platform, and a new INVITE to the indicated address.

4.4.2. Typical operation in an SS7 INAP/CAP network

The switch receiving the original call would have an SS7 INAP/CAP trigger set up for the service number.

When the call arrives, this causes the switch to send an SS7 INAP/CAP InitialDP to the Ocean Services Platform, which matches the service number. The called number parameter causes the service to be started.

The service sends a query for the service number to a database and the database returns the full destination number.

The Ocean Services Platform sends an SS7 INAP/CAP CONNECT back to the switch, which contains the destination number obtained from the database. The switch then routes the call onwards to the specified destination and the Ocean Services Platform takes no further part in the call.

5. Programmability

5.1. Java

A world standard for service programming, using an industry-standard IDE, the Java framework provided with the Ocean Services Platform's Execution Engines enables the rapid development and deployment of services, whilst removing the complexity of JAIN SLEE containers.

The use of Java allows service developers to leverage their existing skill set to create new, innovative services. The Java Service Creation toolkit development Environment provides a rich application interface for working with calls and interacting with other services. The service developer can build on this abstraction, reusing and extending subsystems, in a familiar development environment.

The combination of the Java Service Creation toolkit development Environment and the Java language allows the service developer to think about what the service does, rather than how to get the system to do it. The result is a faster turnaround of services, beating competitors to market.

5.2. Protected Java services

Service protection is available where network operators wish to ensure that their beta or less-valuable services do not interact or damage their key, revenue-generating services.

With the power of programmability comes the danger that services may consume resources on the machine that leave it unable to run other services. A traditional way to resolve this uses an application server per service, but this clearly will not scale when there are hundreds of services or when a Network Operator needs to rapidly roll out a new service.

Telsis understands this issue and, building on its carrier-grade philosophy as used on its Ocean 2280 product, the Ocean Services Platform provides protection and isolation between services. This protection ensures services that use unexpected levels of resource, for example, memory or processor time, are managed appropriately and will not affect other services on the same machine. A misbehaving service is detected and terminated whilst all the other services continue to work.

In addition, services can be deployed to specific groups of Ocean Services Platform Execution Engines. For example, a new service may be deployed to a testing Execution Engine before being rolled out to the whole system.

5.3. Sample services

The Ocean Services Platform is supplied with a set of sample services. Both source and executable code are provided for these services, so service developers using the Ocean Services Platform's Java Service Creation toolkit development Environment (SCE) can adapt them to meet customer-specific requirements.

Four sample services are provided (outlined below).

5.3.1. Service Numbers

The Service Numbers (Number Translation) service enables Network Operators to offer non-geographic numbers and special-rate numbers, allowing them to enter the corporate telephony market.

By using Service Numbers, Network Operators can offer their corporate customers non-geographic freephone, reduced-rate and premium-rate services, using either simple number translation to a fixed- geographically, routable number, or using flexible routing based on the time of day, call distribution, or caller location.

Service Numbers may also be combined with Least-Cost Routing to ensure that calls are routed via the most cost-effective route. This enables Network Operators to maximise their margins on such calls.

5.3.2. Local Number Portability

The Local Number Portability service allows users to switch between Network Operators. When a user switches between Network Operators, the routing of calls to that user changes, as calls should be routed to the correct Network Operator.

There are typically two ways in which calls can be routed to the user: either routing directly to the Network Operator that the user is subscribed to or via a transit carrier, which is typically the incumbent Network Operator. Routing via the incumbent Network Operator is often easier, as the originator does not need to know which Network Operator the user is subscribed to. However, the incumbent Network Operator often charges a fee for carrying out this service. By using Local Number Portability, these fees can be eliminated, reducing call-transit costs.

Local Number Portability may also be combined with Least-Cost Routing to ensure that the calls are routed via the most cost-effective route. This enables Network Operators to maximise their margins on such calls.

5.3.3. Least-Cost Routing

The Least-Cost Routing service provides a means for Network Operators to reduce call transit costs by choosing the most cost-effective route to deliver calls, based on a set of business rules that are stored in a database.

The choice of carrier for international and long-distance calls can have a significant impact on the cost of a call, and each carrier's rates may vary depending on the time of day or how many call minutes that have already carried. The Least-Cost Routing solution helps Network Operators to minimise their costs by choosing the most appropriate route.

5.3.4. A-Party Authentication

In addition to directly connected users, Network Operators also allow users to connect virtually. When using these services, it is vital that the caller (the A-party) is authenticated to ensure that they are an actual subscriber who the network operators can bill.

The A-Party Authentication (Indirect Access / Carrier Pre-Select) service allows Network Operators to screen callers attempting to use their network. Only authorised callers are permitted to use the network.

A-Party Authentication may also be combined with Least-Cost Routing to ensure that the calls are routed via the most cost-effective route. This enables Network Operators to maximise their margins on such calls.

5.4. Legacy services

For customers with an investment in existing Telsis infrastructure, the Ocean 2280 can be connected seamlessly into the Ocean Services Platform, allowing simultaneous support for legacy and new services. The service is simply selected by routing rule and redirected to the serving Ocean 2280.

If a service is subsequently ported to the Ocean Services Platform, the routing is simply updated to move that service to the Execution Engines.

6. Interfaces

6.1. External data access

To add flexibility and intelligence to service flow and routing operations, the Ocean Services Platform can access and make use of external data that is stored on standard relational (SQL) database systems and/or presented by SOAP, RESTful, JSON or raw HTTP web services.

6.1.1. SQL

The Ocean Services Platform supports an external database interface that allows it to access data that is stored in external SQL databases. The external database interface allows the service designer to query external databases using database-access library functions.

Since call-routing decisions can depend on the data returned by the database, it is important to ensure either that the database is designed to return results quickly or that the service is designed (by the service designer) such that caller interaction occurs during the time it takes the database to respond.

6.1.2. HTTP API

The Ocean Services Platform HTTP API allows the service designer perform 3 actions. Services may:

- Query external HTTP web services as an HTTP client.
- Receive information from external systems. (Incoming HTTP requests may either target a single running task, or may be broadcast to all running tasks.)
- Initiate a new task. This new task may be used to initiate new calls, allowing service designers to create ‘click-to-call’ type services.

The service designer has full control over the HTTP method (GET/POST), headers and body. This allows the service to consume any web services protocol that is encoded as part of the HTTP payload, including (but not limited to):

- SOAP
- JSON
- HTML forms
- Free-form HTTP content

6.2. SIP

Supported SIP Methods	INVITE ACK PRACK BYE CANCEL OPTIONS UPDATE REFER
Modes of Operation	Redirect Server Non-Record-Route Proxy Back-to-Back User Agent (B2BUA)
IP Support	UDP/IPv4 UDP/IPv6 TCP/IPv4 TCP/IPv6
SIP-I Support	Allows non-Session Description Protocol (SDP) bodies to be passed through or rejected Non-SDP bodies limited to 1024 bytes
Supported RFCs	RFC3261 RFC3262 Third-Party Call Control (RFC3725)

6.3. SS7 SIGTRAN (option)

The Ocean Services Platform supports SS7 SIGTRAN M3UA over SCTP for connection to legacy networks either directly or via SIGTRAN Gateways.

Application Server Processes (ASPs):

M3UA	RFC3332
SCTP	RFC2960
Near-end point codes	32
Local ASPs	8
IP addresses per local ASP	2
Local Application Servers (AS)	32
Remote Signalling Gateway Processes (SGPs)	16
Remote Signalling Gateways (SGs)	16
Far-end point codes	192

IP Signalling Points (IPSPs):

M3UA	RFC3332
SCTP	RFC2960

Near-end point codes	32
Local IPSPs	8
IP addresses per local IPSP	2
Local IPSP Application Servers (ASs)	32
Remote IPSPs	192
IP addresses per remote IPSP	4
Remote IPSP ASs	192

6.4. SS7 INAP/CAP SIGTRAN Adapter (option)

Note: The SS7 INAP/CAP SIGTRAN option uses the SS7 SIGTRAN option.

The Ocean Services Platform acts as an SS7 ETSI INAP SCF according to ETS 300 374-1 or an SS7 ETSI CAP gsmSCF according to 3GPP TS29.078.

The following operations in the SSF-SCF application context are supported:

ActivityTest	SCF -> SSF
CallGap	SCF -> SSF
Cancel	SCF -> SSF
CollectInformation	SCF -> SSF
Connect	SCF -> SSF
ConnectToResource	SCF -> SSF
Continue	SCF -> SSF
DisconnectForwardConnection	SCF -> SSF
EstablishTemporaryConnection	SCF -> SSF
EventReportBCSM	SCF <- SSF
FurnishChargingInformation	SCF -> SSF
InitialDP	SCF <- SSF
PlayAnnouncement	SCF -> SSF
PromptAndCollectUserInformation	SCF -> SSF
ReleaseCall	SCF -> SSF
RequestReportBCSMEvent	SCF -> SSF
ResetTimer	SCF -> SSF
SpecializedResourceReport	SCF <- SSF

The implementation of SS7 INAP/CAP in the Ocean Services Platform supports routing for SS7 INAP/CAP messages based on global title, point code, or both.

6.5. SS7 MAP SIGTRAN Adapter (option)

Note: The SS7 MAP SIGTRAN option utilises the SS7 SIGTRAN option. The Ocean Services Platform acts as an SS7 MAP MSC / MSS.

The following operations in the MSC-HLR application context are supported:

SendRoutingInfo	MSC -> HLR
SendRoutingInfoForSM	MSC -> HLR

The implementation of SS7 MAP in the Ocean Services Platform supports routing for SS7 MAP messages based on global title, point code, or both.

6.6. Diameter Adapters

6.6.1. Online-charging Ro

The Ocean Services Platform supports the Diameter Ro interface for online billing in accordance with 3GPP specification TS32.299.

6.6.2. Offline-charging Rf

The Ocean Services Platform supports the Diameter Rf interface for offline billing in accordance with 3GPP specification TS32.299.

6.6.3. Sh Interface to HSS (option)

Optionally the Ocean Services Platform supports the Diameter Sh Home Subscriber Server (HSS) interface in accordance with 3GPP specification TS29.328.

6.7. DNS ENUM Adapter (option)

The Ocean Services Platform DNS ENUM Adapter provides the system's ENUM portability interface to a session border controller. It allows SIP-based networks to support number portability using E.164 Number Mapping (ENUM), rather than legacy PSTN call routing. ENUM is a service that translates telephone numbers into Internet addresses (domain names). This allows subscribers to use the existing telephone number formats they are familiar with, whilst allowing calls to be routed the Domain Name System (DNS). ENUM simplifies the way that Voice over Internet Protocol (VoIP) calls work. It

allows VoIP calls to be connected directly over the next-generation IP network, rather than via the legacy PSTN.

6.8. OCP Adapter for Execution Engine interworking with legacy products

An Ocean Services Platform OCP Adapter is available to enable Execution Engine interworking with legacy products to provide an upgrade path for users of legacy Telsis platforms, such as the Ocean 2010 Service Switching Point and Ocean 2281 INAP Interface.

The OCP Adapter translates messages between the Ocean Control Protocol (OCP – as used by legacy platforms) and the NGCP (Next Generation Control Protocol) used by the Ocean Services Platform Execution Engine.

By using the OCP Adapter, Network Operators can leverage their current investments and offer service continuity during migration to next-generation architecture.

6.9. OCP Adapter for Ocean 2280 interworking with SIP and the Ocean Media Server (option)

An optional OCP for Ocean 2280 interworking with SIP and the Ocean Media Server feature allows Ocean 2280 maps to utilise the next-generation Ocean Media Server's audio playback and keypress detection features to replace the legacy Ocean 2010 Service Switching Point's audio playback and keypress detection features. It also allows the next-generation network via the SIP Adapter to be used in place of the Ocean 2010's switching functionality.

This optional OCP feature translates messages between the Ocean Control Protocol (OCP) as used by the Ocean 2280 and the NGCP (Next Generation Control Protocol) used by the SIP Adapter and Ocean Media Sever that form part of the next-generation network.

By using OCP Ocean 2280 interworking with SIP Adapter and the Ocean Media Server, Network Operators can leverage their current investments and offer service continuity during migration to next-generation architecture.

7. Ocean Media Server (option)

7.1. Overview

The Ocean Media Server allows Network Operators to develop interactive services that communicate with callers. The Ocean Media Server not only plays announcements and detects key presses, but also supports key media server features, such as caller recording. The Ocean Media Server also

supports integration with third-party tools to provide features such as Text-to-Speech, Speech-to-Text and Voice- to-Email.

The Ocean Media Server supports a wide range of media codecs, allowing Network Operators to choose the correct codec for their network implementation.

Being integrated as part of the Ocean Services Platform, the Ocean Media Server shares the same operational and management interfaces, reducing both the complexity and costs associated with providing interactive services to callers.

7.2. Specification

Core functions	Media playback Keypress detection (out-of-band) Keypress generation (out-of-band) Media recording (recording delivery via SCP and Email) Media monitoring Media transcoding Media insertion
Service integration	Allows integration with third-party, backend solutions, to provide services such as (but not limited to): Text-to-Speech Speech-to-Text Voice-to-Email
Control interfaces	Integrated with Ocean Services Platform (Next Generation Control Protocol)
Codec support	Standard system supports GSM and G.711 audio codecs with out-of-band keypresses according to RFC4733 (detection and generation) PCMU – G.711 μ-Law PCM at 64kbit/s, 20ms packets PCMA – G.711 A-Law PCM at 64kbit/s, 20ms packets GSM – GSM Full Rate at 13.2kbit/s, 20ms packets Other audio codecs available on request.
Simultaneous sessions	Only limited by software licence and server capabilities
Media capacity	Only limited by server capabilities
Management	Management is integrated with the Ocean Services Platform
Hardware requirements	Varies based on usage and codec

8. Operations and Maintenance

8.1. Fault Management

The Ocean Services Platform incorporates a high degree of self-checking logic to detect and report failures and initiate recovery procedures wherever possible. In addition to internal problems, alarms canreport connectivity faults. These provide an indication of which connections are at fault to help diagnosethe source of the problem.

Fault conditions are reported as SNMP traps that are sent to the Network Operator's network management systems.

In addition to raising alarms, the Ocean Services Platform also generates syslog events that may be usedto diagnose the root cause of any fault that occurs and to assist with service restoration.

8.2. System configuration and performance management

The Ocean Services Platform uses the Ocean 9000 Operational Support System web interface for systemconfiguration and performance management. This provides a web-based GUI with role-based access for staff within the Network Operator.

9. Ocean Service Manager (Option)

Accessing and managing services via the web is so common that it is now seen as essential. Network Operators can gain a commercial advantage by allowing their customers to manage their telephony services via the web.

The key advantages to customers using a web interface to manage their services are:

- **Empowerment** – Customers can configure their communication services whenever theyneed to, at a time and place of their choice.
- **Feedback** – Customers can view service usage and other analytics. This allows them toidentify trends and view the impact of marketing campaigns.
- **Simplicity** – Web interfaces provide a secure, easy-to-use management interface that does not require a Network Operator or its customers to distribute and maintain management toolsto users.

In addition to the end customer, there are also advantages for the Network Operator:

- **Reduced costs** – By allowing customers to manage their services, Network Operatorsrequire fewer customer care agents to handle customer requests.
- **Compelling** – The web interface provides a way of presenting end users with Network-Operator branding and marketing messages, which may be used to reinforce the Network Operator's image.
- **Customer metrics** – Statistics provide a means of understanding which customers are using the system. This allows the Network Operator to promote new services and features to active users and to follow up with customers who are infrequent users so they can understand any difficulties they might have.

The service management web interface is typically the end user's primary point of contact with the Network Operator and so it is vital that it leaves a good impression of the Network Operator and their resellers. A poorly-designed and non-intuitive interface can undervalue the Network Operator, even if theactual telephony systems work seamlessly.

Two optional licenses are available:

1. The Ocean Service Manager System licence that provides the Ocean Services Platform's interface for service configuration and service statistics.

2. The Ocean Service Manager Base Web Application licence for Network Operators that do not wish to develop and use their own Web application. It provides a base set of web pages thatmay be built upon to provide a Network Operator specific web interface to end users.

Network Operators wishing to provide web-based management of Ocean Services Manager based services running on the Telsis Ocean Services Platform have four options:

1. Buy an Ocean Service Manager System licence and an Ocean Service Manager Base Web Application licence, and customisation from Telsis.

2. Buy an Ocean Service Manager System licence and an Ocean Service Manager Base Web Application licence from Telsis and customise it themselves.

3. Buy an Ocean Service Manager System licence and build the web interface in-house.

4. Buy an Ocean Service Manager System licence and contract with an external company to buy a web interface.

9.1. Ocean Service Manager overview

9.1.1. Ocean Service Manager System licence (option)

The Ocean Service Manager System provides two key functions:

- Service configuration
  It allows call-routing parameters and other service parameters to be configured via a SOAP interface. This interface allows Network Operators to create web pages that allow their customers to manage their services.
- Service statistics
  It provides an API for accessing summarised call statistics and statistical call records, allowing Network Operators to provide useful analytics to their customers.

Using the Ocean Service Manager System licence, Network Operators may integrate call-routing configuration and service analytics into their corporate website. Providing API-layer access, Network Operators can use their own web-design teams to control how information is presented to their customers, rather than being restricted to a number of pre-defined templates.

9.1.2. Ocean Service Manager Base Web Application Licence (option)

The Ocean Service Manager Base Web Application licence is a web interface that provides a standard set of template web pages that can be customised to meet the Network Operator's requirements, either by branding the pages or by extending the service to support new functionality.

The web interface implements a user security model and a set of web pages that uses service templatesto implement call flows and provide service analytics.

9.2. Ocean Service Manager System Licence (option)

9.2.1. Overview

Ocean Service Manager System licence provides end-user service management and statistics for OceanService Manager services that are handled by an Ocean Services Platform.

It provides a SOAP interface that allows end-user configuration of service parameters, such as routing numbers or time-based routing rules, and provides a way in which users can view service statistics, suchas the number of calls made to their service numbers, or the number of call minutes over a period of time.

Service-usage statistics may also be retrieved using the SOAP interface. Service statistics are stored for one month at five minutes resolution, and for one year at one hour resolution. Additionally, statistical callrecords are stored for one month.

9.2.2. Ocean Service Manager System Licence components

The Ocean Service Manager System licence consists of three core components:

1. **The SOAP API** – This provides the interface to upstream systems, such as the Base Web Interface.
2. **The Caller Service** – This implements the service logic for the caller services.
3. **The Analytics Engine** – This interprets call statistics and generates service analytics and statistical call records.

9.2.3. SOAP API

The SOAP API provides an XML view of the caller service for a particular service number. The XML viewnot only contains the service parameters, but also contains a definition of the service call flow.

When presenting the service to a user, the Network Operator may either provide a fixed service where the user simply configures call-routing parameters, or they may allow the user to also modify the call flow.

Communication between the Network Operator's web server and the SOAP API is performed using HTTP(S) requests. To read the current service configuration, an HTTP(S) GET request may be made for the required service number.

To modify a service, an HTTP(S) PUT request may be issued containing the updated service configuration. Upon receipt of an HTTP(S) PUT, the SOAP API first parses the XML to check for errors,and then returns either an OK or an error status.

Call statistics and statistical call records may be obtained using similar HTTP(S) requests.

The SOAP API may be configured to only respond to HTTP(S) requests from certain remote devices. However, it does not restrict what information trusted devices may request.

9.2.4. Caller Service

The Caller Service is a Java service that runs on the Ocean Services Platform. It implements the service that the caller interacts with when they call the service number. It is made up of a number of service blocks, which are joined together and configured according to the service-configuration data that was setover the SOAP API.

In addition to providing the service logic, these custom building blocks also define their interface parameters and how they should be represented across the SOAP API.

When presenting the service configuration to the user, Network Operators either may choose to allow theuser to only configure the call-routing parameters or they may choose to also give them the ability to modify the call flow.

If the Network Operator allows the user to configure call-routing parameters, they may choose to simplypopulate a pre-defined XML template, whereas if they allow the user to modify the call flow, they may compile the user's input to create a custom XML definition of the service.

Upon uploading a service definition, the SOAP API first verifies the structure of the XML against the definition of the service-functional elements before committing the service parameters to the configuration database.

9.2.5. Service Blocks

The following standard service blocks are available on Caller Service.

Service Blocks	Description
Area Code Routing	This block branches a service according to the prefix (area code) of the caller's number. This might be used to route calls to a local shop. This block differs from the Origin-Dependent Routing block in that theuser can specify the number prefixes directly rather than by using pre-defined region names.
Blacklist and Whitelist Routing	This block branches a service depending on whether the caller's number matches a blacklist or whitelist entry. This might be used toprevent anyone but employees from calling internal extension numbers directly.
Branch If Visited	This block can be used to direct the flow of call handling depending on whether or not the service has previously passed through one of a particular set of service blocks. This can be used to give different default routing behaviour to different types of callers. An exampleof itsuse would be if a time window matches but its associated area code doesn't. In this instance, a number of time window/area codeassociations could be specified.
Branch On Extension	This block branches the service based on the extension digits that are dialled after a core service number. As service number matching is done on a "best fit" basis, any digits other than those used to match the service number are considered to be the extension. For example, if a caller dials 044112233456 and the core service number is 044112233, the extension is 456. This might be used for services thatare triggered by calls to a core number but that apply special routing to certain extensions of this.
Do Not Disturb	This block allows users to set a flag to indicate that they are busy. Ifthis flag is set, all calls, apart from those with prefixes that match anentry in a VIP whitelist, are handled by a special branch.
DTMF Menu	This block plays an audio announcement to the caller and then collectsa DTMF keypress. It branches the service depending on which key was pressed. If required, branches within the block can be configured to loop and play the announcement again before waiting for a keypress. This is useful, for example, either when there is no keypressor when there is no configured exit branch for the keypress.
DTMF Menu System	This block allows a user to dial in and configure variables that override some of the standard settings. Specifically, for each of their service numbers, callers to the service number can configure variables that enable or disable Do Not Disturb, Fax recognition, Follow Me Routing, and number blocking on various call types. They can also define alternative destination numbers to which call delivery should be attempted before the standard routes, as defined by the network operator, are tried. Subsequent calls to each user then use this new configuration.

Service Blocks	Description
Emergency Routing	This block can be used to apply special routing for emergency situations, for example, if there is a flood or power failure. The destinations for the special routing can be defined in advance and then, in an emergency condition, the routing can be activated for a group of numbers by an administrator setting a single emergency flag.
Follow Me	This block allows users to set a flag to indicate that they temporarily want their calls to be routed to an alternative destination. When Follow Me is activated, all other service settings are retained, so that when it is deactivated, the previous routing is reinstated. This might be used by staff who are working temporarily at a site that is differentfrom their normal location.
Number List Routing	This block is similar to the Area Code Routing block in that it selects the next block to use based on whether or not the caller's number is ina list of specified numbers. However, unlike the Area Code Routing block, there is only one match exit instead of one per matched prefix.
Origin-DependentRouting	This block makes a routing decision based on the caller number by performing a best-match prefix lookup on a fixed list to determine thename of the originating region. The next block to use is based on theregion name. This might be used for region-dependent routing.
Percentage Distribution	This block distributes calls over several subsequent blocks in a specified proportion. Up to five percentages and associated blocks canbe specified. This might be used to share calls between a number of agents to provide a timely response to callers.
Play Audio	This block plays the caller a user-loadable announcement. This can be used to greet or inform the caller.
Queue	This block holds callers in a queue until there is someone available to answer the call. Callers in the queue can be played audio of your choice, and can exit the queue by pressing a key – for example, if they prefer to leave a message to be called back later.
Record Call	This block flags to the system that the call should be recorded to a .wav file and delivered by email. Call recording only starts on called- party connection, which may be at a later point in the call flow than the Record Call service block. In this case, for example after further announcements to the caller, the system remembers that call recording was requested and applies it at the appropriate time. Whenthe call between the caller and the called party clears down, the system sends the .wav file to the specified email address.
Record Message	This block records the caller's voice to a .wav file, and optionally playsan audio message before recording starts. When the caller clears down, the system sends the .wav file to the specified email address.
Route On Flag	This block selects the next block to use based on whether or not a flaghas been set. If the flag is set then one exit is taken. If the flag is not set then the other exit is taken.

Service Blocks	Description
Screening	This block examines the address of the caller and applies screeningcriteria so that calls from particular sources can be rejected. This might be used to restrict a service to callers from a particular area only. The number prefixes that cover this area could be whitelistedwhilst blacklisting all other callers. The following criteria can be used for screening: Whether or not the call came from an international number Whether or not the call came from a mobile phone Whether or not the call came from a fixed network number Whether or not the call came from a payphone Whether or not the call came from a Fax machine Whether or not the call is anonymous Whether or not the caller's number matches a blacklist or whitelistentry (determined by prefix matching with the best match applied). When both blacklisting and whitelisting are used, the whitelist is applied first and, if the prefix matches a whitelist entry, the blacklistcheck is skipped.
Set Up FCI	This block configures the data that is used in the FurnishChargingInformation (FCI) messages that are sent by the Standard Routing and Screening block types. An FCI message requests the SSF to generate and register a call record or to includesome information in the default call record. This data might be usedfor off-line charging of a call.
Standard Routing	This block attempts to deliver the call to a defined destination. If the destination is busy or the call is not answered within a certain period,an attempt can be made to deliver the call to an alternative number. This process repeats sequentially through a list of alternative numbers, until either the call is answered or the list is exhausted. This might be used with a single destination number to perform number translation from a service number to a geographically routednumber. It could also be used by a small business to ring a sequenceof phones until someone answers: the office phone, followed by a mobile, followed by delivery to a voicemail service. If required, the block can also be configured to handle outgoing call failures for different reasons in different ways, with the next block touse determined by the reason for the delivery failure. If required, the block can also be configured to limit the number of simultaneous calls made to a particular destination number. The block attempts to route a call to a destination number only if there are less than a configurable number of calls in progress to that number. If thenumber of concurrent calls matches (or exceeds) the configured limit,further calls cause an exit from the block, so that the service designercan determine how to proceed. The block includes the option to play a user loadable announcementto the called party (whisper) before connecting the caller.

Service Blocks	Description
Terminate Call	This block clears down the original call with a user-defined reason (release cause).
Time and Date Range Routing	This block allows end users to set up special call handling for particular ranges of time as defined by a start time and day and an end time and day. It is similar to the Time-Dependent Routing block inthat it attempts to deliver the call to one of a number of destinations depending on the time of day and date at the time of routing. However, unlike the Time-Dependent Routing block, the time periodcan span multiple days, and can be switched on and off for specific lengths of time.
Time-Dependent Routing	This block allows end users to set up a regular pattern of call routing over a weekly cycle. It also supports appropriate call routing for defined holidays. The block works through a list of user-defined time ranges (time of day and day of the week) checking to see if the current time falls within a time range. If the time does fall within a time range, control jumps to the next block that is defined in that time range. Overlappingor duplicate time ranges can be defined: in such cases the first match found determines the routing. This might be used by the owner of a small business to route calls tofit around when they are available in the office.

Note that some of these call-routing primitives require the Ocean Services Platform to operate in Back-to-Back User Agent (B2BUA) mode and remain in-context for the duration of the call.

9.2.6. Analytics Engine

The Analytics Engine provides access to summarised call statistics (which are useful for trend analysis andbusiness forecasting) and individual call details (which provide a record of each call made to the service).

Summary statistics provide the following reports:

Call counts

This shows the user how many calls were made to their service number per interval over a time range. It includes a breakdown that shows how many calls were answered successfully and how many calls failed to be answered.

The user can specify the time range for the report.

Call counts per originating region

This shows the number of calls originating from each region over the time range specified by the user.

Call minutes

This shows the user the sum of call minutes that were made to their service number per intervalover a time range. The figure per interval is the sum of the duration of every call that started in that interval.

The user can specify the time range for the report.

Call minutes per originating region

This shows the total call minutes originating from each region for calls starting in the time range specified by the user.

Average call duration

This shows the user the average duration of calls that were initiated to their service number per interval over a time range. This average is in seconds and is based only on the calls that were answered successfully.

The user can specify the time range for the report.

Average time to answer

This shows the user the average time to answer for calls to their service number per interval overa time range. This average is in seconds and is based only on the calls that were answered successfully.

The user can specify the time range for the report.

Statistics are maintained for one month at five minutes resolution, and for one year at one hour resolution.

These statistics allow the Network Operator to provide useful analytics to their customers, and may be presented in a number of different formats, such as a normal time-based graph or as trend graphs showing day-by-day or week-by-week trends. Such graphs are also useful in understanding the impact ofmarketing campaigns or other major events.

In addition to the above statistics, custom-service functional blocks may contain custom data points thatare also summarised by the Analytics Engine. Up to 32 custom data points may be defined as part of services.

Details of individual calls may also be retrieved using the SOAP API. The Analytics Engine stores statisticalcall records for all calls made in the last month.

9.2.7. Integration

The Ocean Services Manager may be deployed either on dedicated hardware in a data centre or in acloud-hosted infrastructure.

Since the Ocean Services Manager is accessible to the Internet, suitable precautions should be taken toisolate it from the core telephony network. We recommend it is located between two firewalls and onlyessential routes are enabled on these firewalls.

9.3. Ocean Service Manager Base Web Application Licence (option)

9.3.1. Overview

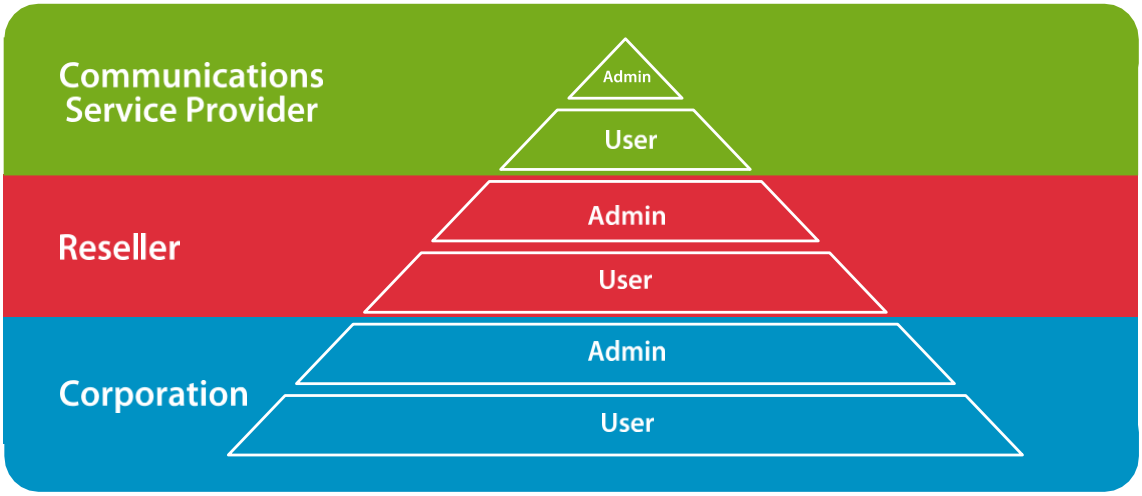
The Ocean Service Manager Base Web Application is a web interface that provides a set of web pagesthat can be used in conjunction with the Ocean Service Manager System licence to provide:

- User security
- Service configuration
- Service usage analytics

The web interface may be branded to match the Network Operator's own branding plus their reseller'sbranding, using style sheets, and extended to support additional functionality as required. This customisation may either be done by the Network Operator or by Telsis (charges apply).

9.3.2. User security

The web interface implements a layered user-security model.



The following gives an outline of the capabilities and resources available to people logging in to the system using accounts with these roles at each layer in the business model.

9.3.3. Communications Service Provider

The Communications Service Provider (CSP) is the Network Operator who owns the system, that is, thesystem is deployed in their network and controls calls through their switching infrastructure. This organisation owns all of the service numbers for which the system handles the calls.

Administrator:

CSP-level administrators can:

- Add or remove service numbers from the system
- Add or remove service templates
- Create and edit service templates using a text editor
- Create and delete resellers
- Create, manage and delete administrator and user accounts within the realm of the CSP (all resellers and all corporations)
- Assign service numbers and service templates to resellers
- Access all service numbers to view or change the service template
- Access all service numbers to view or change the parameters associated with the current service template
- View reports and statistics for calls to each of the service numbers on the entire system

User:

CSP-level users can:

- View all service numbers and templates, but cannot edit anything
- View reports and statistics for calls to each of the service numbers on the entire system

9.3.4. Reseller

The resellers are intermediaries who sell on service numbers and services to the corporations that use them.

Administrator:

Reseller-level administrators can:

- Create and delete corporations
- Create, manage and delete administrator and user accounts within the realm of the resellerand the corporations who are customers of the reseller
- Assign service numbers and service templates to corporations from the set that the CPS allocated to them
- Access service numbers belonging to their corporate customers, to view or change the service template
- Access service numbers belonging to their corporate customers, to view or change the parameters associated with the current service template
- View reports and statistics for calls to each of the service numbers available to that reseller

User:

Reseller-level users can:

- View the service numbers and templates available to the reseller, but cannot edit anything
- View reports and statistics for calls to each of the service numbers available to that reseller

9.3.5. Corporation

Administrator:

Corporation-level administrators can:

- Create, manage and delete administrator and user accounts within the realm of thecorporation
- Configure which service template, from the set that their reseller allocated to them, is used to handle calls to each of their service numbers

- View or change the parameters associated with the current service template for each of their service numbers
- View reports and statistics for calls to each of their service numbers

User:

Reseller-level users can:

- View or change the parameters associated with the current service template for each service number that the administrator has given them access to
- View reports and statistics for calls to each service number that the administrator has given them access to.

All activities are logged in a transaction log for auditing purposes and to meet regulatory requirements,where applicable.

9.3.6. Resource management

The key resources in the system are the service numbers and the template services.

Service numbers are imported to the web interface by a CSP-level administrator. Single or multiple servicenumbers then can be assigned to resellers. Resellers can then assign service numbers to corporations.

Service numbers cannot be moved directly from one corporation to another (or from one reseller to another). They need be removed first and the then reassigned. The web interface performs validity checking when numbers are imported to prevent duplicate entries.

The service templates are defined in text files. CSP-level administrators can create and edit service templates using a text editor.

Service templates are imported to the web interface by a CSP-level administrator. Single or multiple templates can then be assigned to resellers. Resellers can then assign templates to corporations. Thesame template can be used by multiple resellers and corporations.

Service templates are presented to users graphically to make it clear how calls to the service are handled.

9.3.7. Service configuration

The web interface supports multiple service templates. These templates, which are an XML definition ofthe service, define the service flow, configuration parameters, and the look and feel of the configurationservice.

The CSP may license each of the service templates to other organisations, which may in turn license theservice to lower-layer organisations.

Users may assign service templates to service numbers and configure the service with appropriate call-routing parameters.

Service changes are applied to new calls arriving on that service number.

9.3.8. Service statistics

The web interface provides a set of core service statistics, which can be viewed online, either in tabular orgraphical format, or downloaded as CSV files.

The web interface allows the following statistics to be viewed:

- Total number of calls in period
- Total number of calls per geographical region
- Total number of call minutes in period (where available)
- Success or failure ratio for calls in period (where available)
- Average call duration for calls in period (where available)
- Average call answer duration for calls in period (where available)

Statistics are maintained for one month at five minutes resolution, and for one year at one hour resolution. These statistics may be viewed for a single service number or all service numbers that are allocated to the organisation.

In addition to the service analytics, statistical call records (not suitable for billing purposes) are availableto view and download as CSV files. Statistical call records are stored for one calendar month.

10. Capacity and licensing

The Ocean Services Platform is licensed in terms of throughput (calls per second), capacity (calls sessions) and internal service-data capacity. The Ocean Services Platform is licensed for an unlimited number of machines (physical servers, virtual machines or cloud instances), provided that the throughputand capacity is licensed.

Options and services are subject to additional licences.The standard solution is licensed to support:

- A throughput of 100 calls attempts per second
- A capacity of 1 000 simultaneous calls
- An internal service-data capacity of 100 million records
- External Data Access (SQL & HTTP)
- SIP Adapter third-party call control
- Sample Services Pack
- Diameter Ro and Rf Adapters
- OCP Adapter for Execution Engine interworking with legacy products
- Integrated Ocean 2280 for backwards compatibility
- Support for IPv4
- SNMP and Syslog fault diagnostics
- Web-based system operations and management

Optional licences are available to support:

- Increases in system call attempts per second throughput (units of 100 CAPS)
- Increases in system simultaneous calls capacity (units of 1 000 Simultaneous Calls)
- Java Service Creation toolkit development Environment (SCE)
- SS7 INAP/CAP SIGTRAN Adapter
- SS7 MAP SIGTRAN Adapter
- DNS ENUM Adapter
- Mediation to other CDR formats
- Diameter Sh Adapter interface to Home Subscriber Server
- Ocean Media Server (units of 1000 simultaneous call legs)
- OCP Adapter for Ocean 2280 interworking with SIP and the Ocean Media Server
- Ocean Service Manager System and Base Web Application
- Support for IPv6
- Other services

In addition to these licences, service-design consultancy and training services are also available. Please contact Telsis or an authorised Telsis Partner for further details.

11. Features and benefits

Feature	Advantage	Benefits
The Ocean Services Platform is scalable both in terms of capacity and resilience	The platform can be scaled to meet current and future capacity requirements	Maximises return on investment
The Ocean Services Platform is programmable using industry standard Java	New services can easily be developed by Java programmers which are commonly available rather than needing specialistservice developers	Reduces costs of creating newservices
The Ocean Services Platform supports legacy services	Legacy services can continue tobe created, modified and run	Reduces cost of deploying newsystems
The Ocean Services Platform supports multiple services	Multiple services can be run on a single platform without the complexity and costs (both in terms of purchase, training, integration, etc) of running multiple platforms	Reduces complexity and costs
The Ocean Services Platform is a multimedia platform	Not limited to voice services – can also handle messaging, video, and other communicationchannels	Reduces complexity and costs
The Ocean Services Platform provides Diameter Ro and Rf interfaces	Can be integrated with standard,next-generation billing systems	Provides ability to charge subscribers
The Ocean Services Platform supports rich data connectivity	Can be integrated with multiple database systems	Provides greater flexibility torespond to new market opportunities
The Ocean Services Platform is supplied with a standard set of services	Allows standard services to be launched immediately and provides example services thatcan be tailored to meet specificrequirements	System can be launched quicklyreducing overall deployment costs and speeding up time to market
The Ocean Services Platform is resilient to failure	The service can continue to operate even in the event of ahardware failure	Protects revenue streams

12. Contact Us

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