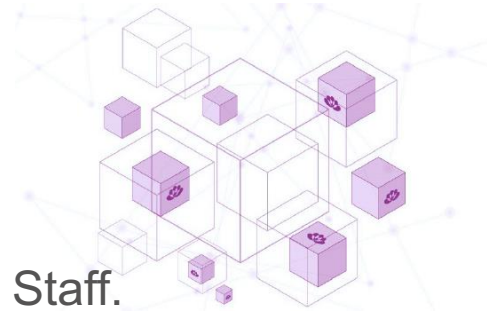




**Company Profile**

# ABOUT CATALEYA



Headquartered in Singapore, privately owned by the Management and Staff. with our R&D offices/labs in the Silicon Valley, California, USA and Pune, India and a regional support and business offices are in the UK.

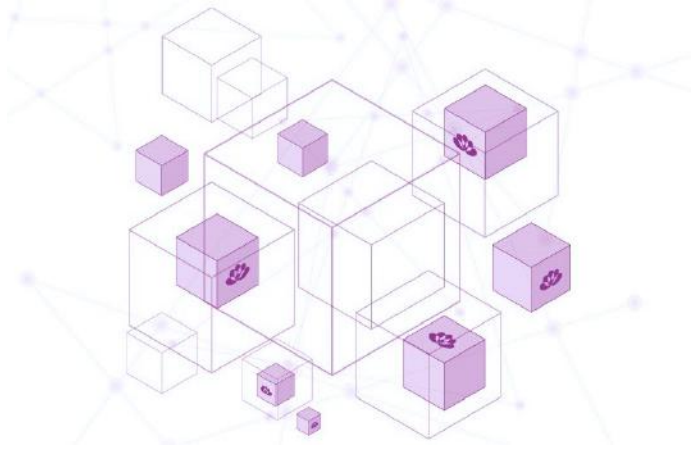
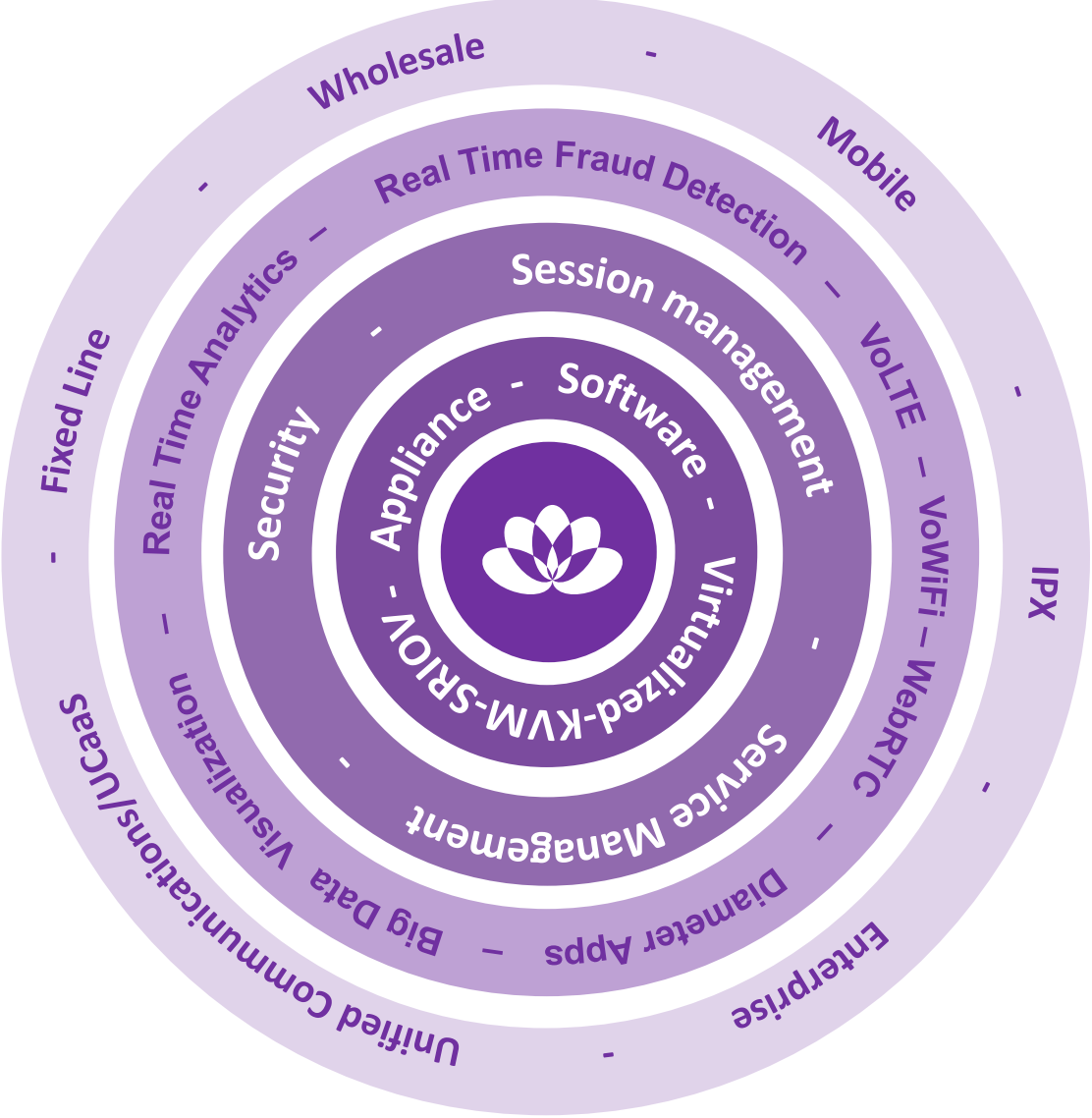


We develop Real Time Communications Switching Platforms with the award winning flagship product **Orchid One** being successfully deployed at 15 customers across in North America, Europe, Africa and Asia. The largest deployment has 16 nodes in the network for over 2 years.

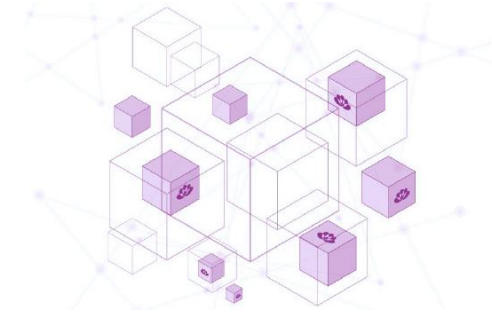


We understand ourselves as **“The technology workshop with a marketing mind-set”**  
We pride ourselves in **being, fast, flexible, reliable and easy to do business with.**  
We aim to **deliver innovative technology and solutions that serve a purpose** relevant to our clients and their clients.

# CATALEYA TECHNOLOGY & MARKETS



# CATALEYA SOLUTIONS



## NETWORK FUNCTIONS VIRTUALIZATION

Designed and built for deployment in your cloud OS, providing flexibility and elastic scalability that suits your network requirements



## FRAUD PREVENTION

Integrated machine learning voice fraud detection engine provides detection, mitigation and prevention of voice fraud.



## WHOLESALE, NNI, LDI

Enhanced signaling, media and routing management simplifies your operations and delivers reliable and cost effective services to your partners



## BG, PROXY, IPX, SIP CONNECT

Streamline interworking between IPX-enabled networks with enhanced visibility and performance across All-IP networks



## WEBRTC

Supports full WebRTC to SIP interoperability in your networks. Full compatibility with any browser or mobile app



## VOLTE/VOWIFI

Simplifying the management of complex interconnections that allows full compatibility between IMS-IMS and IMS – non IMS call flows. A powerful IBCF that offers multiple services in a single equipment.

# CATALEYA PORTFOLIO



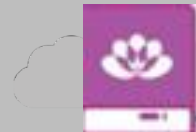
## ORCHID ONE / TWO (APPLIANCE)

- ❑ HIGH PERFORMANCE APPLIANCE
- ❑ 100K CONCURRENT SESSIONS, 2000 CPS
- ❑ COMPREHENSIVE FUNCTIONALITY
- ❑ OPEX AND DEFERRED CAPEX
- ❑ IPX, MOBILITY AND TIER 1 INTERCONNECT



## ORCHID AIR (NFV EDITION)

- ❑ VIRTULIZED AND CLOUD ENABLED
- ❑ AWS ENABLED
- ❑ EASY DEPLOYMENT AND SCALING
- ❑ UCAAS, MOBILE ACCESS AND OTT
- ❑ BYOD
- ❑ ALL FUNCTIONALITY OF ORCHID ONE
- ❑ ONLY SOFTWARE LICENSING COSTS



## ORCHID SUITE (BUSINESS EDITION)

- ❑ INTERGRATED BILLING, LCR AND RATING
- ❑ SOFTSWITCH REPLACEMENT
- ❑ EASY DEPLOYMENT AND SCALE
- ❑ LOWEST COST
- ❑ SMALL AND MEDIUM WHOLESALE AND RETAIL



## ORCHID ZERO (FREE SBC)

- ❑ VIRTULIZED AND CLOUD ENABLED
- ❑ EASY DEPLOYMENT
- ❑ UCAAS, MOBILE ACCESS AND OTT
- ❑ AWS ENABLED
- ❑ BYOD
- ❑ CORE FUNCTIONS
- ❑ ONLY SOFTWARE STACK COSTS

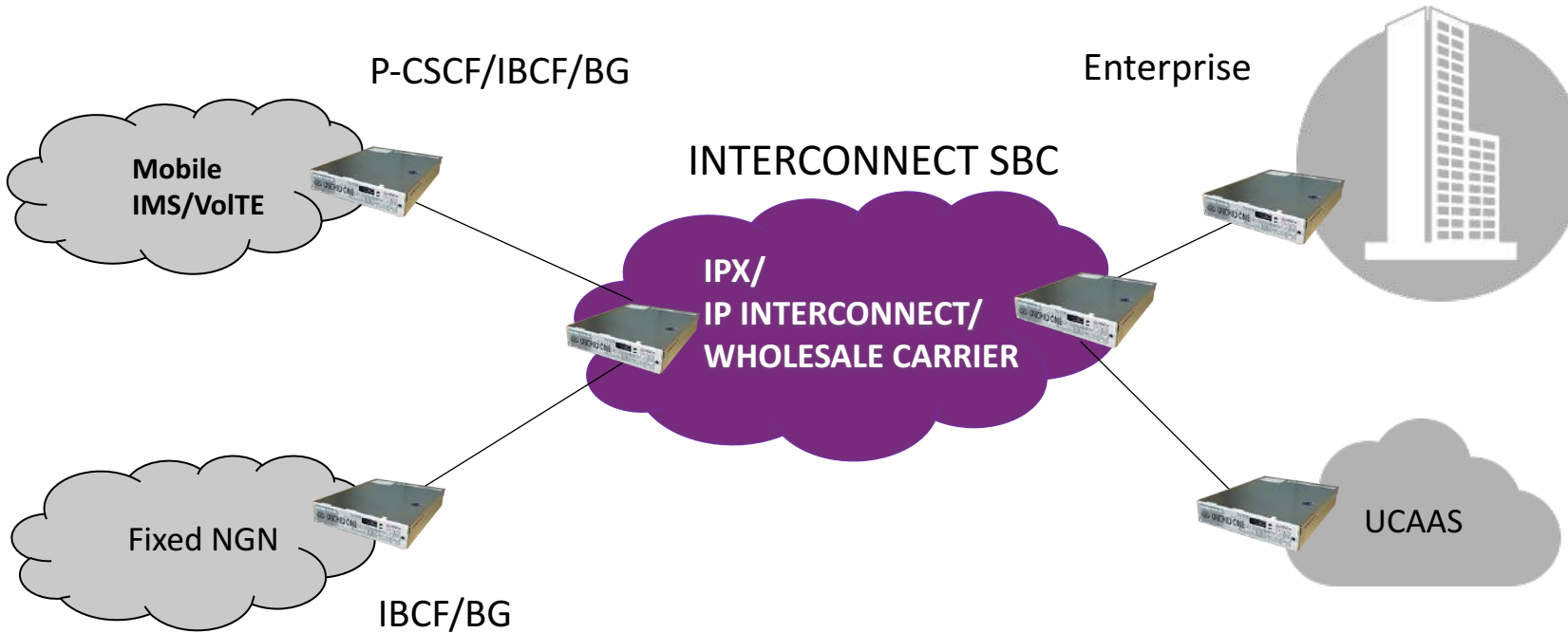


## ORCHID GLASS (REAL TIME INTEL)

- ❑ 10X OPEX SAVINGS, PROACTIVE SLA MGMT
- ❑ MACHINE LEARNING, RULE BASED INSIGHT CORRELATION
- ❑ BIG DATA BASED NETWORK ANALYTICS
- ❑ FRAUD DETECTION AND MITIGATION
- ❑ OPERATIONAL EFFICIENCY AND REVENUE ASSURANCE



# CATALEYA SOLUTIONS-INTERCONNECT SBC/IPX SOLUTION



## HIGH PERFORMANCE COTS HARDWARE

- Upto 100K Media Sessions, 2000 SIP sessions/Sec, 20K+ Transcoding Sessions
- 2U Form Factor
- Fully Redundant Configuration with Carrier grade Resilience and Availability

## ADVANCED TRANSCODING

AMR, Silk, OPUS and EVRC codec support

## SIMPLIFIED MANAGEMENT AND OPERATION

- Central Ops Manager
- Advanced 360
- QOE/QoS Analytics
- SLA Management

## SERVICE MANAGEMENT

- Service Creation
- Service Execution Broker

## COMPREHENSIVE SECURITY AND ENCRYPTION

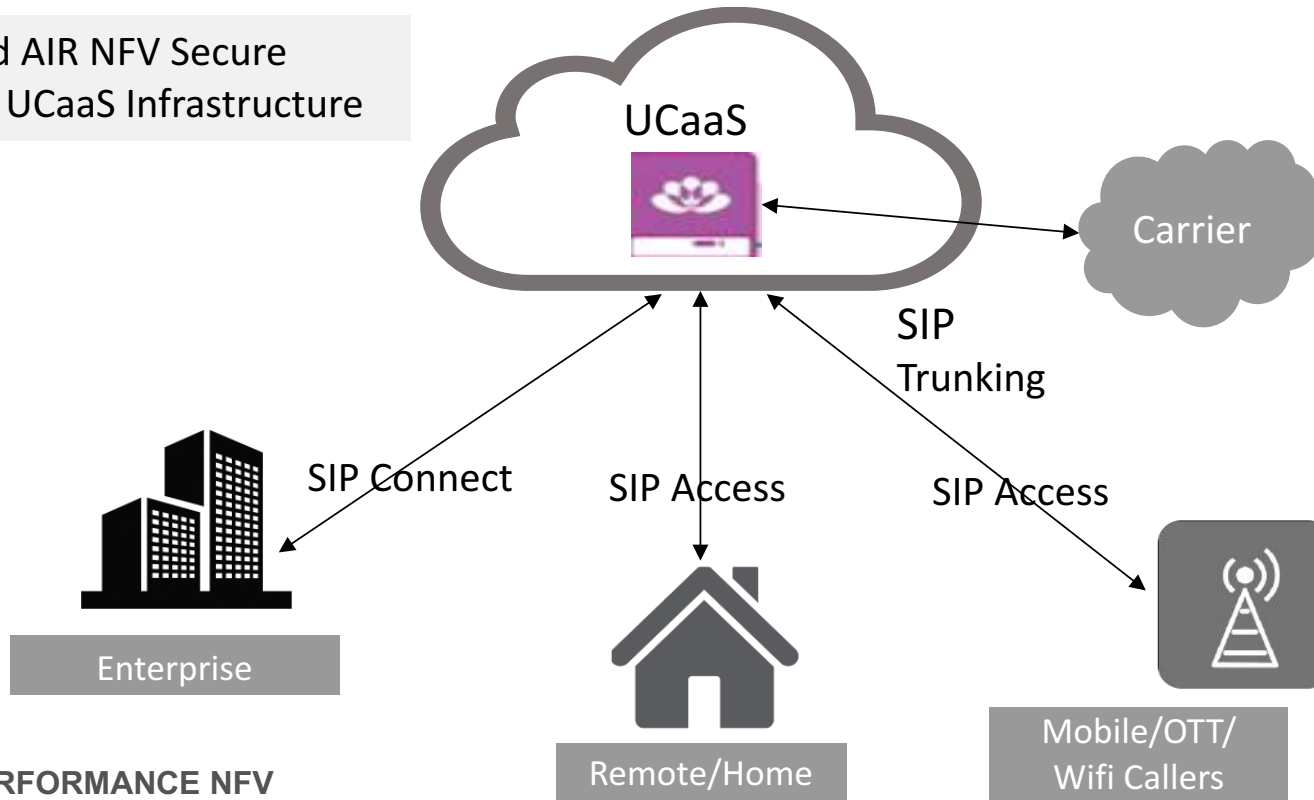
- SIP and RTP security
- TLS, SRTP, DTLS, IPSEC support

## MULTIPLE FUNCTIONAL ROLES

- MNO's are forced to buy and deploy different appliances to deal with different call scenarios (IMS and Non-IMS). The O1 can perform all in a single box.
- In Same Hardware Supporting multiple functional roles such as Interconnect SBC, IBCF/BG, P-CSCF, TrGW, WebRTC Gateway
- Network wide Licensing

# CATALEYA SOLUTIONS-UCAAS SECURE ACCESS SBC

Orchid AIR NFV Secure  
Cloud UCaaS Infrastructure



## HIGH PERFORMANCE NFV

### ENABLED SOLUTION

- Industry leading performance in virtualized environment
- Laterally Scalable by adding more compute and processing nodes

## SIP ACCESS AND TRUNKING

- SIP Connect 2.0 compliant
- TLS/SRTP
- SIP Trunk Registration
- FE/NE- NAT Traversal
- Optimal Media Handling

## APPLICATION ENABLEMENT LAYER

O1 Provides Service Creation and Execution modules to seamless enable new applications in the UCaaS

## SAF-FULL COMPATIBILITY

Preconditions engine will ensure call flow success and compliance when interconnecting with Non-IMS environments. MNO's can't afford to be disconnected from CS type Telco's or keep legacy equipment to ensure compatibility. The SAF framework unique flexibility makes SIP message adaptation easy and the call eligible to any interconnect restrictions.

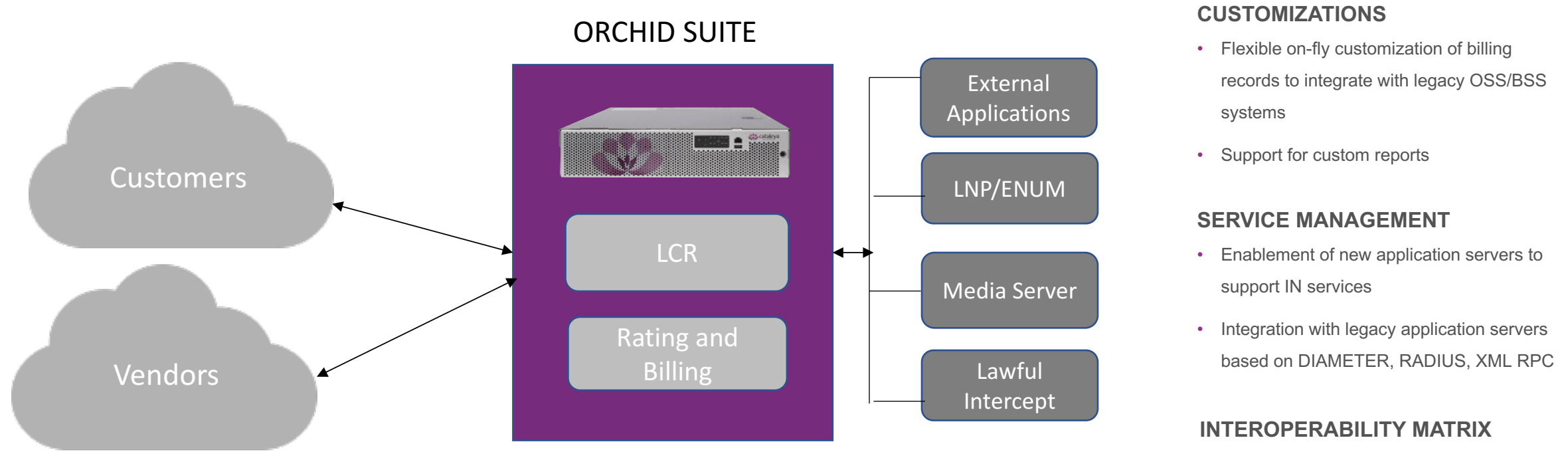
## REAL TIME QOS/QOE.

We are still the best in the market providing real time analytics and E2E visibility to the carrier.

## RESTFUL API LAYER

Northbound Applications can perform FCAP's functionality using web based REST API infrastructure

# CATALEYA SOLUTIONS-WHOLESALE VOICE SWITCH IN A BOX



## SWITCH CONSOLIDATION

- Consolidate Legacy Hardware and Software switching and gateways using high performance O1 Platform
- Switch Partitioning
- Exhaustive set of operational tools- call tracing, test calls, auto-answer, media analysis

## SIGNALING AND MEDIA

### INTERWORKING

- Support of Legacy and Advanced SIP RFC's
- Extensive support of call flows and SIP features
- SIP-I/SIP-T Support
- DTMS Interworking

## INTEGRATED BILLING AND ROUTING MODULES

O1 can act as the entry point or exit point of the MNO IMS. In both cases the intelligent firewall and if selected the Fraud Machine Learning Engine will protect both ends.

## CUSTOMIZATIONS

- Flexible on-fly customization of billing records to integrate with legacy OSS/BSS systems
- Support for custom reports

## SERVICE MANAGEMENT

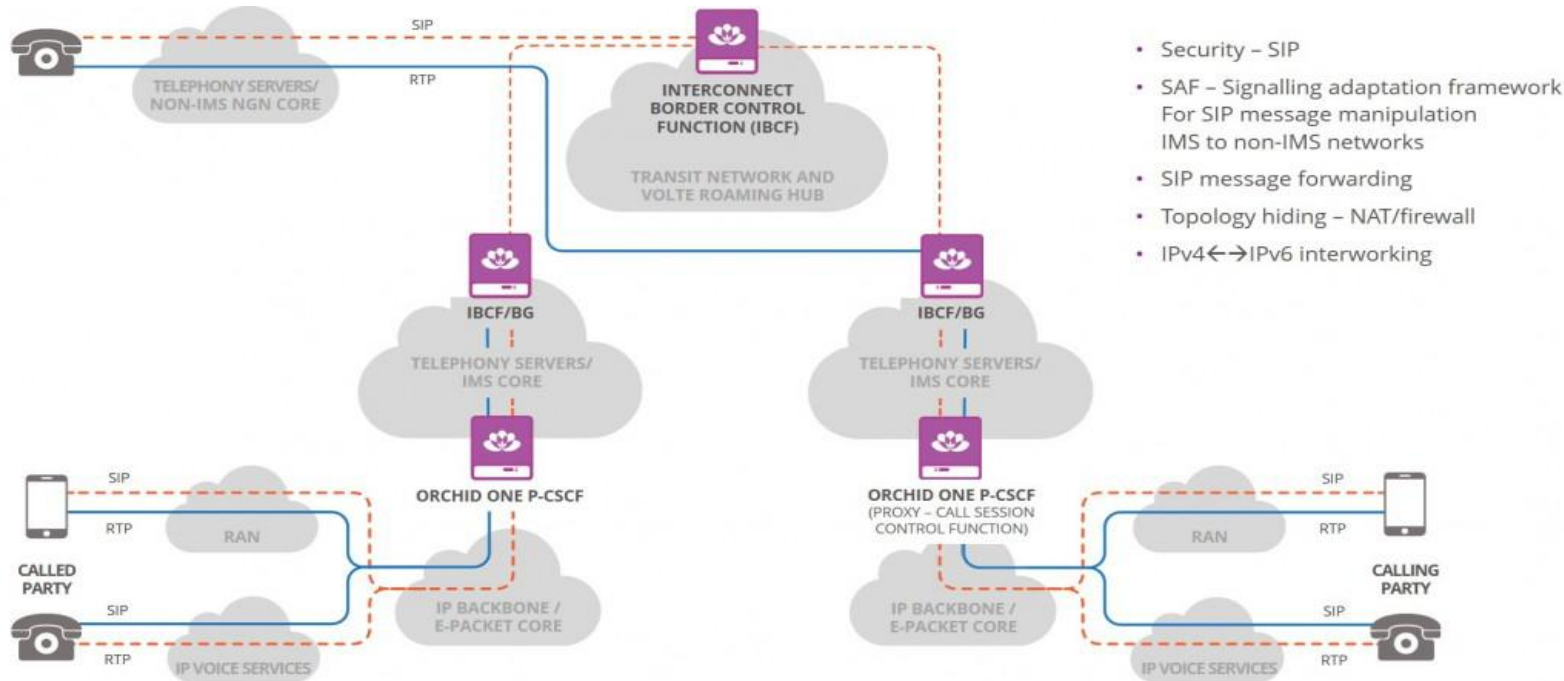
- Enablement of new application servers to support IN services
- Integration with legacy application servers based on DIAMETER, RADIUS, XML RPC

## INTEROPERABILITY MATRIX

- Telarix
- TeledynamicX
- FastLink, AutoLCR
- OrcaWave
- Jerasoft
- Sonus PSX, Dialogic
- Lifecycle Auth, Prepaid, Open RADIUS
- Freeswitch



# CATALEYA SOLUTIONS: VOLTE/VoWIFI



## REAL TIME QOS/QOE.

- We are still the best in the market providing real time analytics and E2E visibility to the carrier.
- As an IBCF we can ensure visibility to the MNO when the call leaves his network. Plus the module to manage the SLA's and QOS will save the MNO money by having a system that does the job for them.
- Due to our Big Data Engine and trend analysis we can help the MNO make the best decisions when selecting the Roaming Partners.

## SINGLE ELEMENT

MNO's are forced to buy and deploy different appliances to deal with different call scenarios (IMS and Non-IMS). The O1 can perform all in a single box.

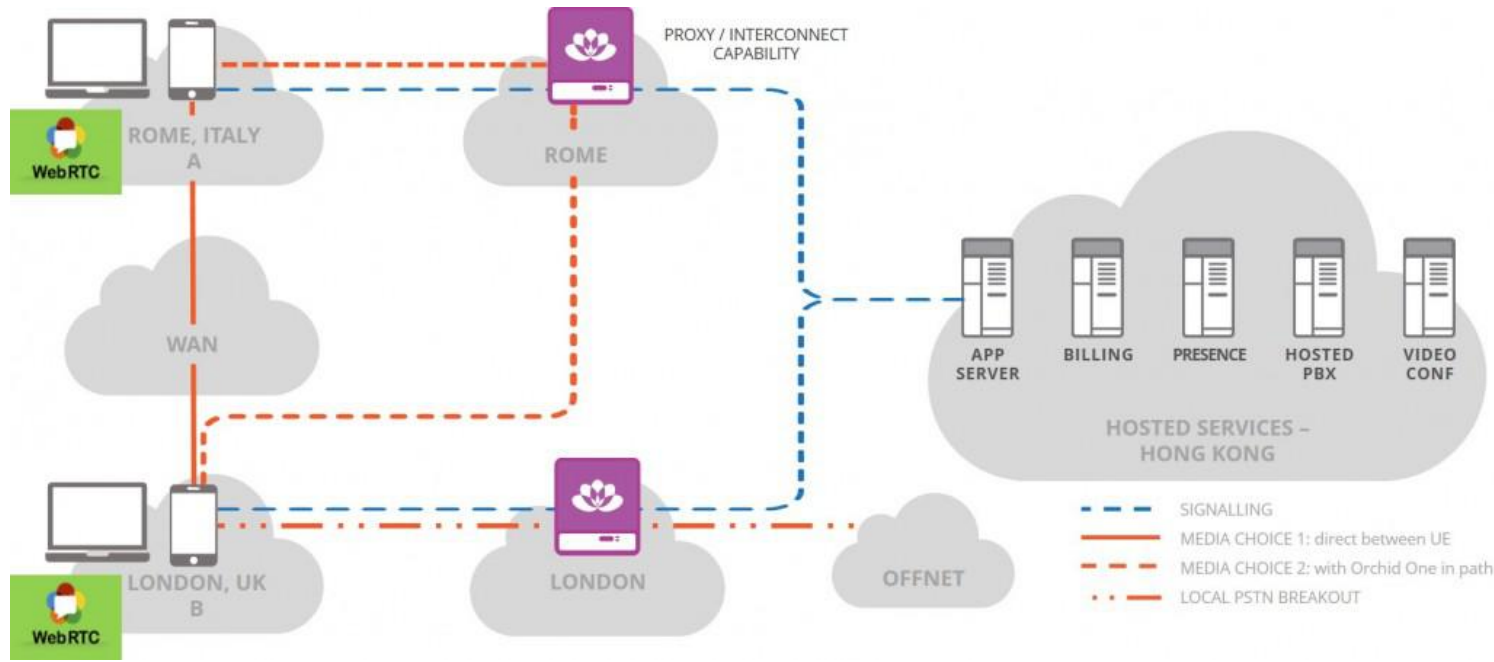
## ENHANCED SECURITY

O1 can act as the entry point or exit point of the MNO IMS. In both cases the intelligent firewall and if selected the Fraud Machine Learning Engine will protect both ends.

## FULL COMPATIBILITY

Preconditions engine will ensure call flow success and compliance when interconnecting with Non-IMS environments. The SAF framework unique flexibility makes SIP message adaptation easy and the call eligible to any interconnect restrictions.

# ORCHID ONE: WEBRTC GATEWAY



## WEBRTC FUNCTIONALITY

- SIP over Secure WebSockets
- ICE/STUN
- SIP INTERWORKING

## REAL TIME QOS/QOE.

- We are still the best in the market providing real time analytics and E2E visibility to the carrier.
- The Carrier can leverage that visibility to troubleshoot potential issues in WebRTC or SIP calls. No need for probes or any additional application, the WebRTC protocol will have the same analytical capabilities as the other protocols in the O1.
- Carrier ensures top quality voice service to the enterprises.

## SIMPLICITY

- Compatible with any client that complies with WebRTC standards.
- Only product in the market that combines WebRTC gateway and SBC in the same appliance.

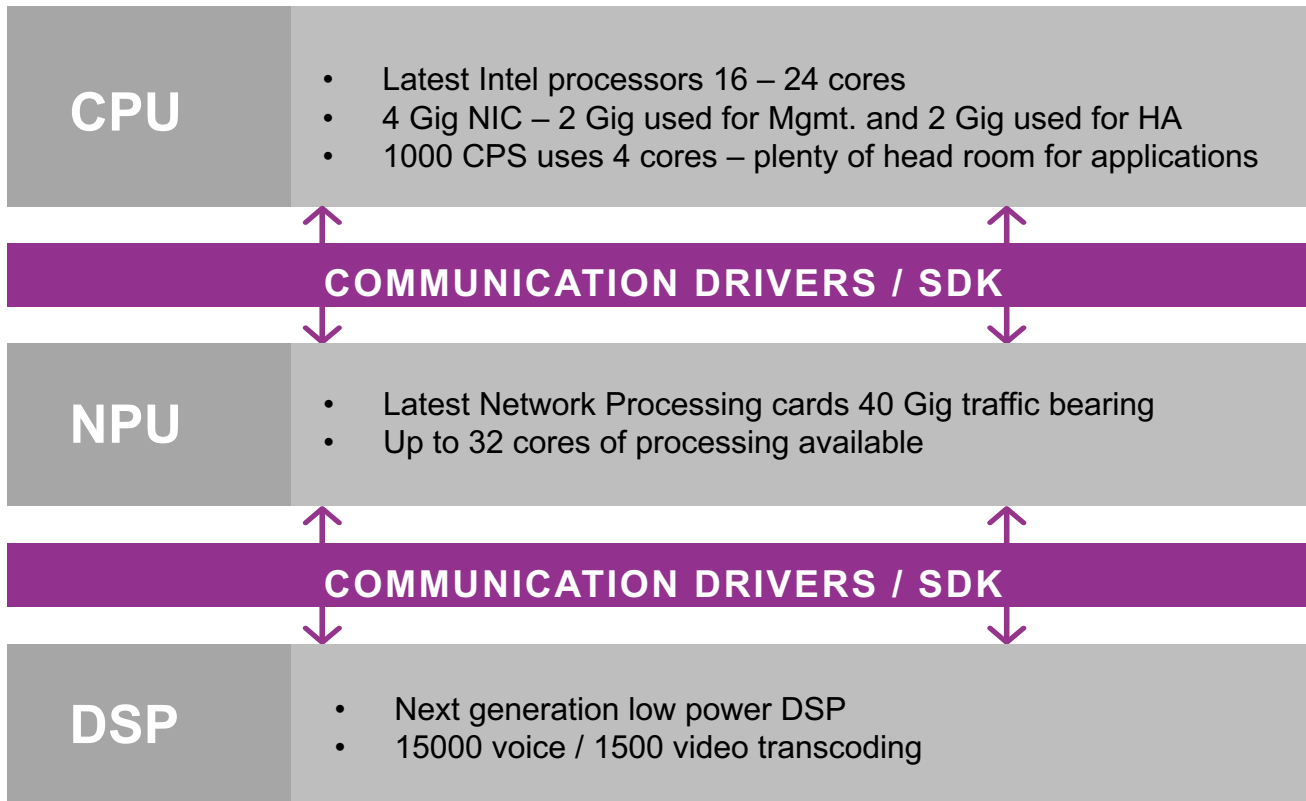
## ENHANCED SECURITY

- WebRTC server interface will need to be exposed to the public. It is imperative for any enterprise to secure their communications. O1 supports DTLS encryption and its counterpart SRTP when the call is routed to SIP.
- O1 service aware firewall will act as an intelligent agent fending off any potential malicious attack.

## MEDIA INTERWORKING

- Advanced Media Transcoding between OPUS, AMR, SILK and Legacy Codecs

# CATALEYA PRODUCTS-ORCHID ONE APPLIANCE



## KEY FEATURES

### PERFORMANCE AND SCALE

- High Performance COTS based Platform
- 100,000 sessions concurrent @2000 cps
- 15,000 sessions transcoding Voice / 1500 video with AMR, SILK, OPUS Codec support

### COMPREHENSIVE SESSION MANAGEMENT

- Multiple Roles-Interconnect SBC, Wholesale Switch, Access SBC, IBCF/BG, P-CSCF, Proxy

### SIMPLIFIED MANAGEMENT AND OPERATIONS

- Central management system
- Template based configuration
- 360 degree visibility

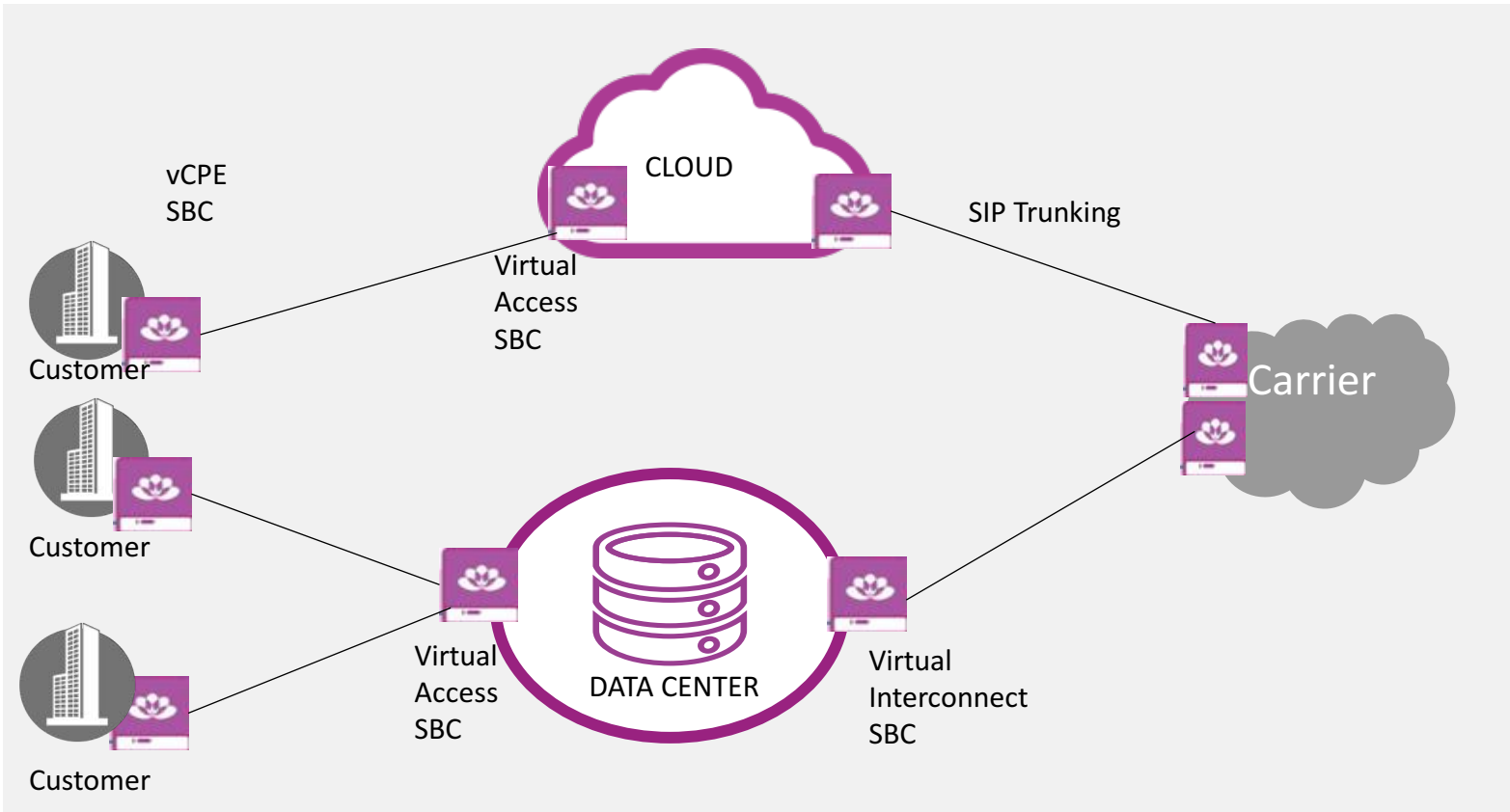
### SERVICE AND APPLICATION ENABLEMENT

- Service Creation GUI
- Service execution engine
- External interfaces-LNP/ENUM/DNS/DIAMETER/XML-RPC/RADIUS

### Real time Fraud and Anomaly Detection

- Machine Learning Algorithms
- Big Data Network Analytics
- Integrated Business Intelligence tools and reports

# CATALEYA PRODUCTS-ORCHID AIR NFV EDITION



All Unique features from award winning flagship Orchid One are available on NFV based Orchid Air that can run on standard dedicated, virtualized or cloud infrastructure.



CLOUD ENABLED



MULTIPLE HYPERVISORS



SCALING



FLEXIBLE  
DEPLOYMENTS



LOWEST CAPEX AND OPEX

## IN ADDITION TO ORCHID ONE FEATURES

### KEY FEATURES

#### Architecture, Performance & Scalability

- Optimized "Fastpath" packet processing
- Distributed Control and Media Plane Architecture
- Dynamic Scaling
- Service and Context Aware Traffic Management ensure high SLAs

#### Operations & Orchestration

- Cataleya Central Operations Manager
- Multi-Tenancy Features
- Integration with Cloud Infrastructure Management Solutions
- API & Northbound Interfaces
- Network Wide Licensing

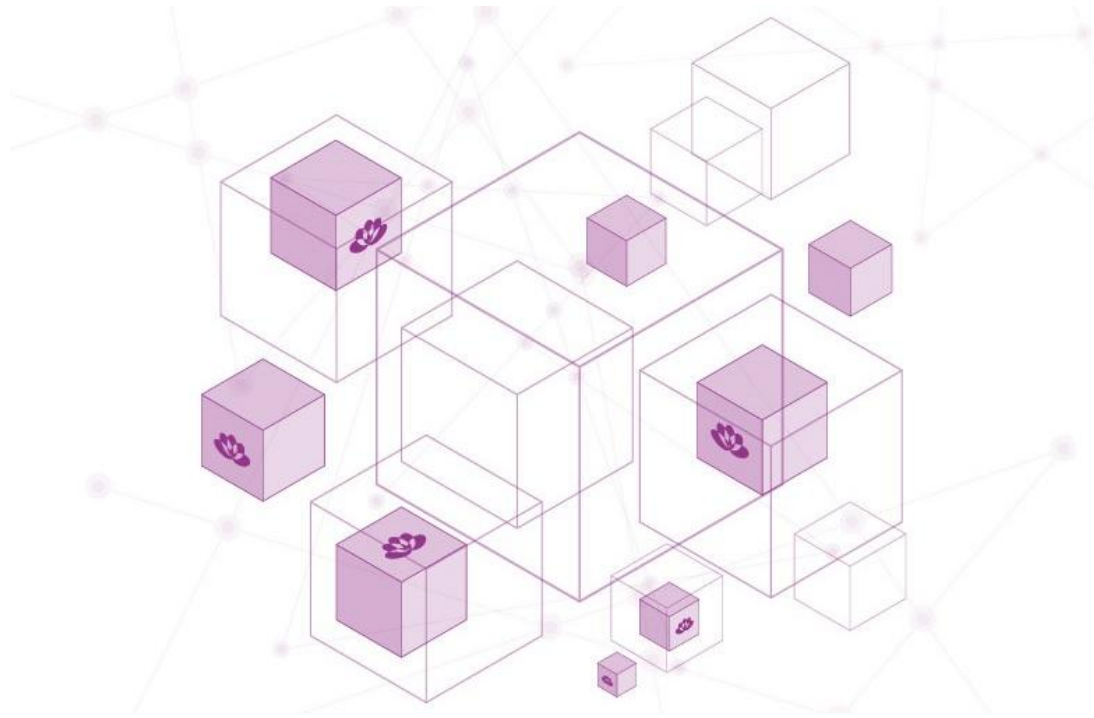
#### Service & Revenue Assurance

- Real-Time Analytics/QoS Session Steering
- Big Data Network & Service Analytics
- SLA Management
- Intuitive Diagnostic Tools
- Fraud & Anomalies Management
- Integrated Business Intelligence (BI)

#### Deployment Flexibility

- Commodity Hardware 'Bare Metal' SBC platform as a Service (PaaS)
- Virtualized SBC 'Virtual Network Function (VNF)' as a service (VaaS)
- Network Partition as a Service (iNaaS)

# CATALEYA PRODUCTS-ORCHID ZERO



ONE PRODUCT-MULTIPLE SOLUTIONS



SELF-SERVICE  
PORTAL



CLOUD READY



DOWNLOAD,  
DEPLOY  
COLLABORATE



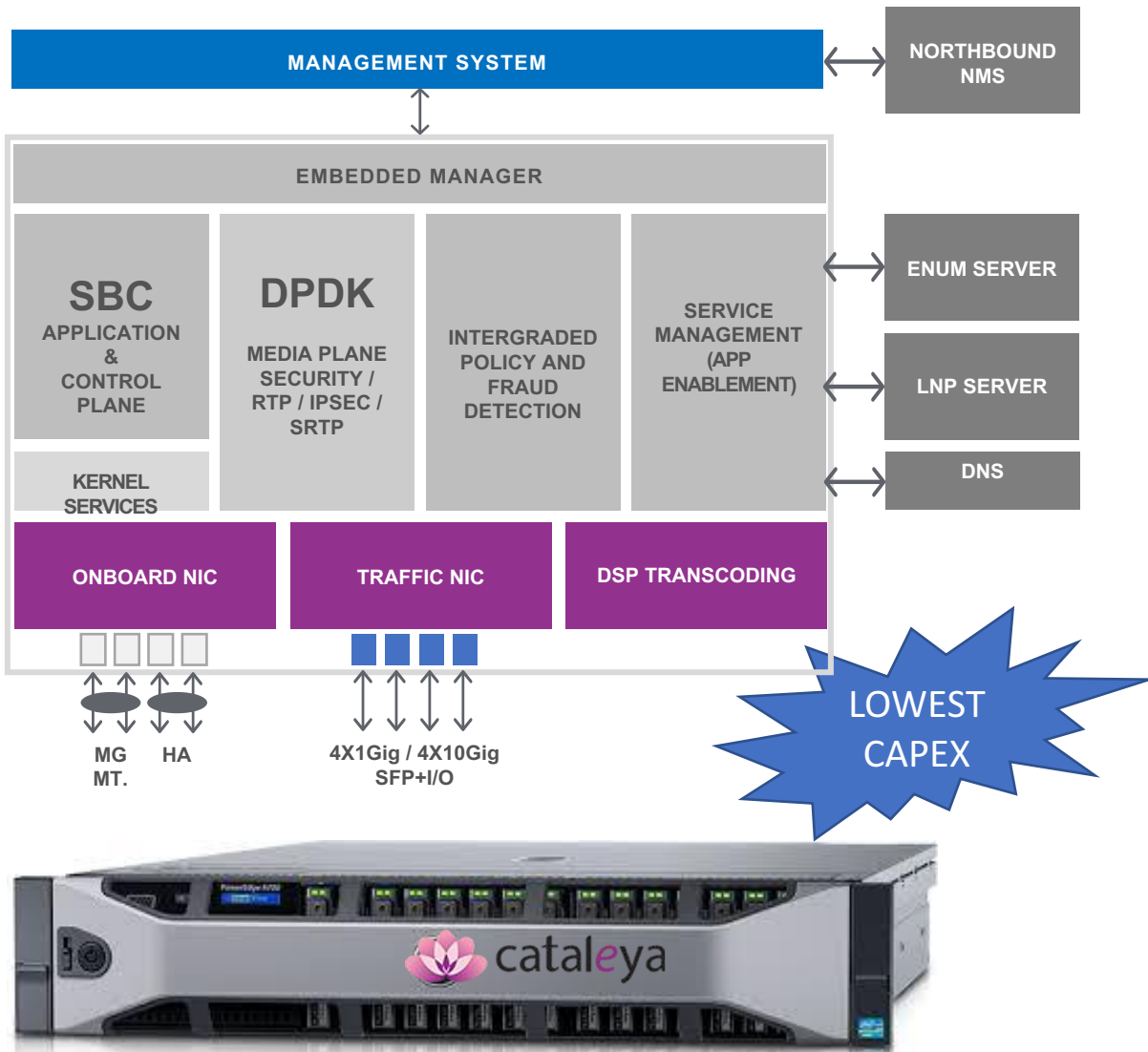
CAPEX FREE



CAP AND GROW

- ❑ FIRST-INDUSTRY'S FREE SBC
- ❑ PREMIUM-PREMIUM FEATURES AND HIGH QUALITY AT NO COST
- ❑ BUY AS YOU GROW - NO ARTIFICIAL LIMIT ON CAPACITY
- ❑ SUPPORT-INITIAL SUPPORT AT NO COST
- ❑ OFFER-500 CONCURRENT SESSIONS@100 CPS IS FREE

# CATALEYA PRODUCTS-ORCHID SOFTWARE EDITION



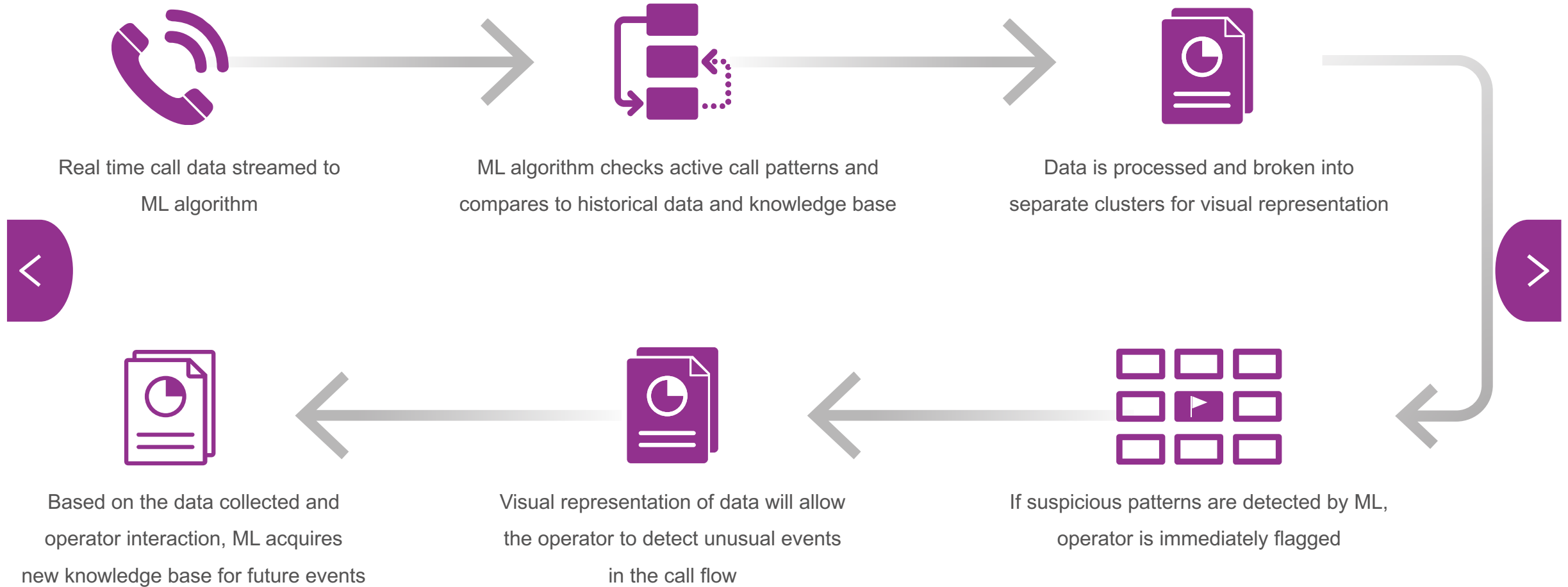
## ALL GREAT FEATURES OF ORCHID ONE SOFTWARE

### KEY FEATURES

- HIGH PERFORMANCE AND SCALE**
  - 80,000 Concurrent RTP/SIP Sessions
  - 2000CPS
  - High Density Transcoding with PCI module-22K
- BRING YOUR OWN HARDWARE**
  - Standard Dell/HP server
  - 2xCPU Xeon CPU, 64GB RAM, 4x1G or 10G NIC, 500GB HDD
- DEPLOYMENT OPTIONS**
  - Dedicated Server
  - Virtualized
- REPURPOSE AND SAVE ON HARDWARE**

# ORCHID ONE – REAL TIME FRAUD DETECTION

## Orchid One – DATA FLOW AND MACHINE LEARNING (ML) PROCESS CYCLE



# ORCHID ONE: FRAUD MANAGEMENT

## 1

### REAL TIME DETECTION

- All competition FMS are based on a reactive approach through CDR analysis. O1 offers real time by being the only system in the call path.
- Seconds after the call starts, the O1 begins analyzing the behavior.

## 2

### MACHINE LEARNING

- Conventional FMS are based on rule system. O1 abstracts itself from the rules and allows the ML to learn about the network and fine tune the detection based on the typical network patterns.
- ML + Real Time provides a powerful combination **unique** in the market.

## 3

### MEDIA ANALYSIS

- O1 is the only platform that analyzes media flows and is able to detect delays or absence.
- We can successfully detect media delay, 1 way media or no media. In case of no media the O1 can automatically disconnect the call.
- In case of Media delay, reports will calculate and flag the amount of minutes lost when dispute is required.

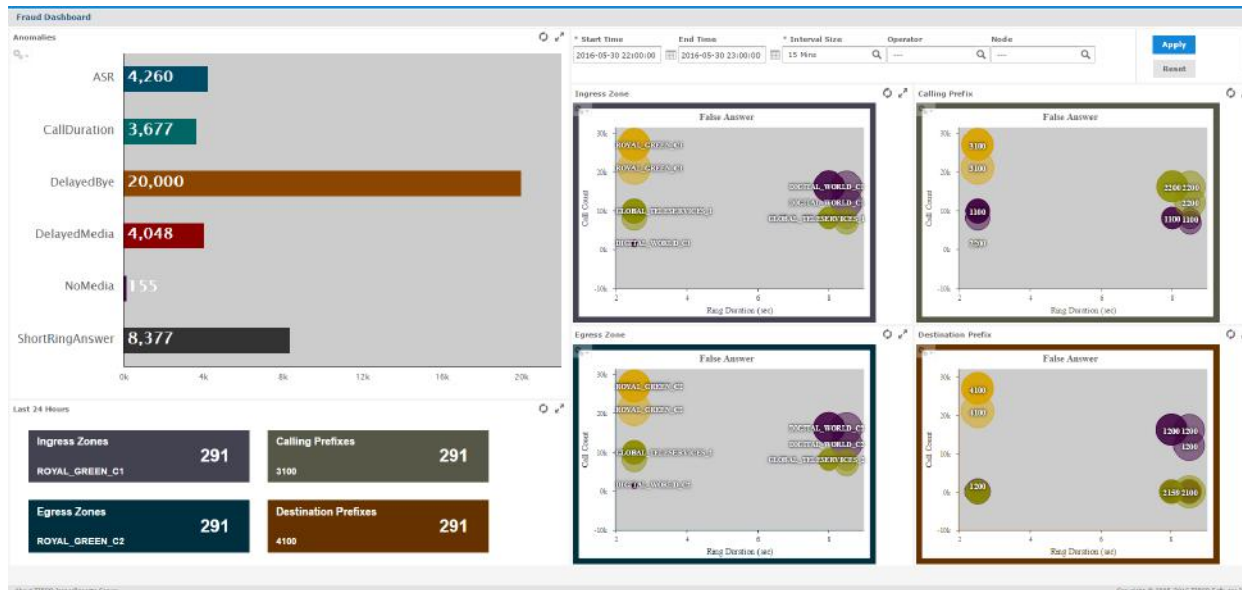
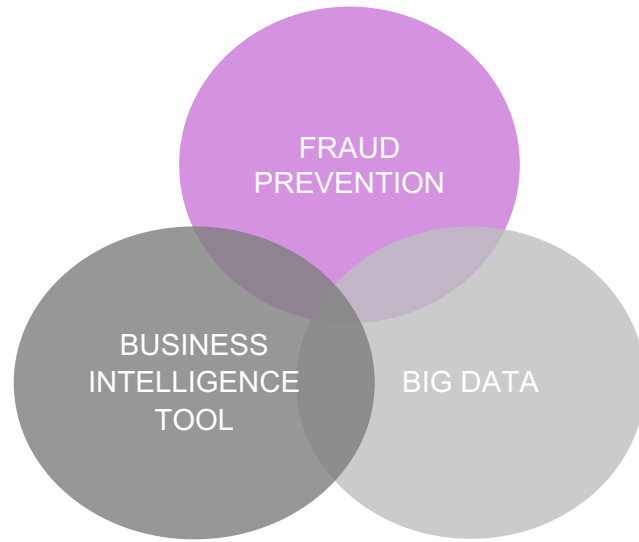
## 4

### INSIGHTFUL REPORTS

- After detected the Fraud will be visually represented in the BI reports.
- Extensive analysis is performed and packaged in the periodical business reports, showing how much damaged is contained and affected parties.



# ORCHID ONE: ANALYTICS AND BUSINESS INTELLIGENCE



## FRAUD DETECTION

The Fraud detection feature is divided in two segments. The first is the Machine Learning (ML) algorithm running in the Node itself. The ML will look in real time to all the call flows and try to match them to the following pttens:

All Anomalies Patterns that can be discovered from call events in the ML are:

- Unallocated Number
- Call Diverted
- Wangiri Callback
- After Business Hours
- Premium Destination
- Wangiri (One Ring Disconnect)
- No Media
- Dialer Traffic
- Abnormal Call Duration
- Abnormal ASR
- Media Supervision
- False Answer
- Delayed Bye

**THANK YOU**

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

# Backup Slides

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

# ORCHID ONE FEATURES

## SIP Features

Interconnect B2B User Agent Call Model (NAT, Topology Hiding, Security)

RFC 3264 SIP Offer/Answer

RFC 3261 SIP Messages and Header Support (Interconnect Feature set)

Call Admission Control (call rate, call limit, BW) at system and customer level.

Codec Negotiation

Media Control (Relay, By-Pass)

PRACK, Forking, Session Refresh Procedure Support

SIP OPTIONS Ping

Reason Header Support

FQDN Resolution for Remote IP Peer(Local)

Load Balancing and CAC policies across customer remote endpoints.

Zone Based Session Steering

Profiles (QoS, Codecs, SIP)

Session based KPI's and Stats

## Media & Security Handling

RTP/RTCP Media Relay

Media NAT (address and port translation, topology hiding)

DoS/DDOS attack blocking at H/W

ACL

VLAN

TOS/DSCP settings

Media BW CAC at Customer, System, Port Level.

Multiple IP Address Support

Universal Shared IP Address support

## Platform Capabilities

120,000 SIP Concurrent Calls (Tested)

1000 Calls Per Second (Tested)

20K RTP Flows (can go to 50K with 4Gig Card, limitation on the test tools)

200 Customer Zones

## Hardware Platform Specs

4x1 Gig Ethernet Traffic Interfaces

4x1Gig Ethernet Interfaces for Mgmt. and HA.

500GB HDD, 32 Gig RAM

Front Panel Telco Alarms

Remote Management Module(RMM)

AC and DC Redundant Power Supplies

## Config & Management Capabilities

Graphical User Interface for Configuration

Dashboard and System Chassis View

Alarms

Debugging shell



# ORCHID ONE FEATURES

## Access SIP Features

SIP Registrations Initial and Refresh  
SIP Access Call Flows  
Transaction and Message Handling (Subscribe, Notify, Publish, REFER, Message)  
Call Services (Call transfer, conference, recording etc..)\*  
NAT handling and traversal(Far End)  
Media Control-Transcoding  
DNS based FQDN Resolution  
Dynamic Blacklisting  
Security-SIP TLS

## Billing Module

Access and Interconnect Billing Records  
IP CDR's

## Policy Engine

Static Routing/Default (Zone to Zone)  
Parameter Based Policy Rules  
Least Cost Routing and Weight  
Priority based routing  
Session Re-Routing and Redirection  
Time of Day  
Session Re-Routing and Redirection  
Overflow Routing  
Number Directories  
Directory Lookup  
Data Manipulations (Set, Get, Test)  
Route Treatments/Actions  
Route Filters/Post Processing Rules  
Media Transcoding Control.  
User Interface for Advanced Policy Routing

## Transcoding & Media Features

H/W DSP based Transcoding  
Static Transcoding

## Media Plane Features

Media NAT Traversal (Latch, STUN)  
Hierarchical QoS-Policing  
Dynamic Blacklisting  
Grey Lists  
Policy based IP routing  
Dynamic Firewall Policies

## Platform Features

1:1 Box Level redundancy  
Software Restartability  
IPMI Integration for Server Management  
10Gig (4x10gig) Interface Support  
Stateful Session Mirroring and Recovery

## Central Management System

Multi-node web based central manager  
Offline Configuration Builder  
SAM-Service Assurance  
Manager Views  
Maintenance Operations  
Role Based Access Control for shared access/partitioning

## Operational Tools

Log Management and Log Viewer  
Service Assurance Manager  
KPI Reports



# ORCHID ONE FEATURES

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## SIP Features

SAF for IWF Function  
SIP event package for QoS and SLA mgmt.  
SIP Advanced (SIP-I)

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## Analytics

Customer and System Voice Scores (MOS and R-Factor)  
SLA Manager  
QoS Metrics Calculation for Real time Enforcement

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## Media Features

RTP Analysis and RTCP-XR generation  
Media Re-Origination  
Media Recording  
Advanced Queuing (Strict and Priority Queuing)-Platinum-Bronze service levels.

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## Central Management System

Configuration offline and Backup  
Software Upgrade Support

---

## Security

IPSEC

---

## Policy Engine

QoS Based Session Steering  
Policy Based Transcoding Control (Policy Triggers)

---

## WebRTC Features

SIP over Secure WebSocks  
DTLS/SRTP  
ICE/STUN support

---

## Operational Tools

Session Recording  
Tracing (Signaling and Media)

---

## Service Assurance Manager

SLA Reports  
SLA Maps

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## Service Management

Programmable GUI based service creation environment  
Exhaustive list of plugins for application integration

