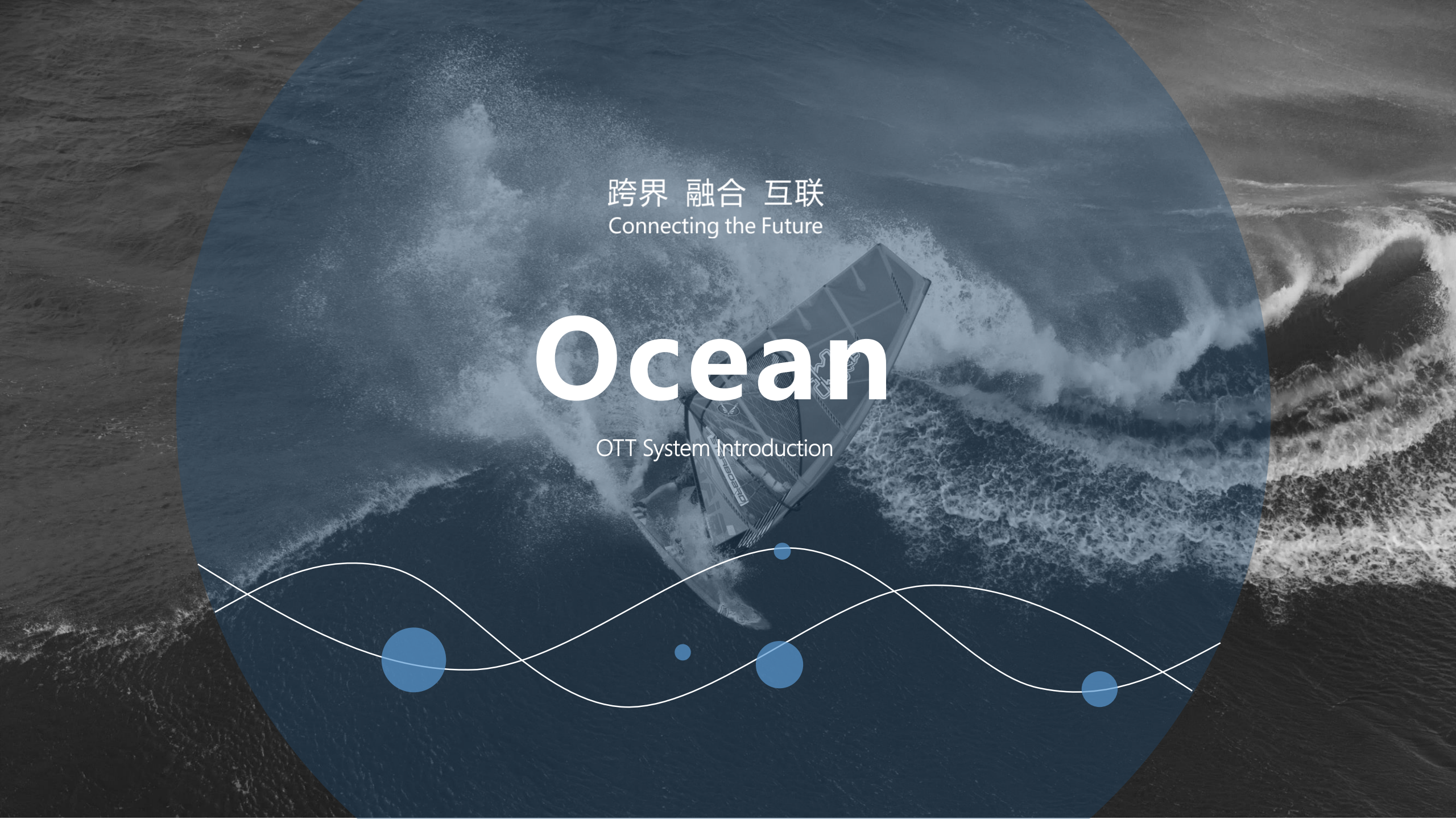


跨界 融合 互联

Connecting the Future

Ocean

OTT System Introduction

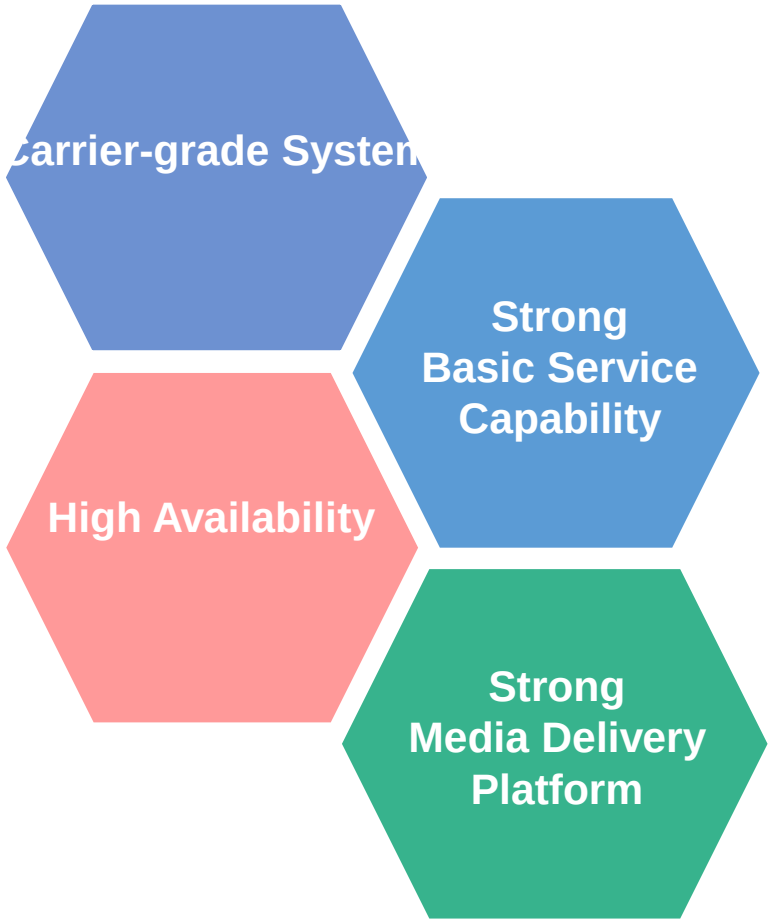
CONTENTS

» 01 System Features of Ocean

Carrier-grade Solution

Carrier-grade and Expansible Solution

- Separation of control and the media
- High scalability
- Cluster-based technical architecture and common hardware platform
- Support million users scale
- Provide a strong operating platform for content provider
- Support distributed deployment



- Support VOD and Time-shifted TV
- Support Live TV
- Support to switch between diffrent rate

- Provide redundancy backup of key components
- No single point of failure
- With 99.999% reliability

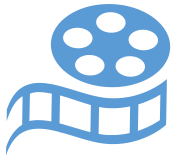
- Media delivery based on P2P
- Irrespective with media format
- Support mass storage and concurrent large-scale streaming media
- Support multi-level deployment

Carrier-grade Solution

OTT Platform Features

Live TV
Management and monitoring

Video on Demand
Manage VOD content, prices, covers, trailers and detailed information.



Catchup TV
Full automatization and workflow management.

Transcoding
Automated transcoding in cloud with different profiles and bitrate.

Carrier-grade Solution

OTT Platform Features

EPG
Management, manual or automated EPG import from Cloud.

Billing
Packages, Subscription periods with traditional or pre-paid subscribers.

Real-time & Detailed statistics
Advanced CDN, Devices and client statistics with usage and revenue reports.

Advertising
One click integration with 3rd-party Video Ads providers.

White-label solution
Easy to transform and customize.

OTT Market Requirement

There are two fundamental criteria any technology (OTT or IPTV) has to meet in PAY TV industry: reliability and quality.

signal may be delivered to different platforms: smartphones, tablets, game consoles, digital media boxes, STBs, etc.

OTT lets monetise on such value-added features as:

Real-time broadcast television and VoD
Time-shifted viewing of selected broadcast programs (nPVR)
Non-linear viewing (Time Shift / Pause Live)
Viewing of recorded programmes (Catch Up)
Smart recommendation and content search system
Integration with user accounts in social networks, ability to store user generated content and view it on various devices
Functionality described above requires cutting-edge technology and innovativ

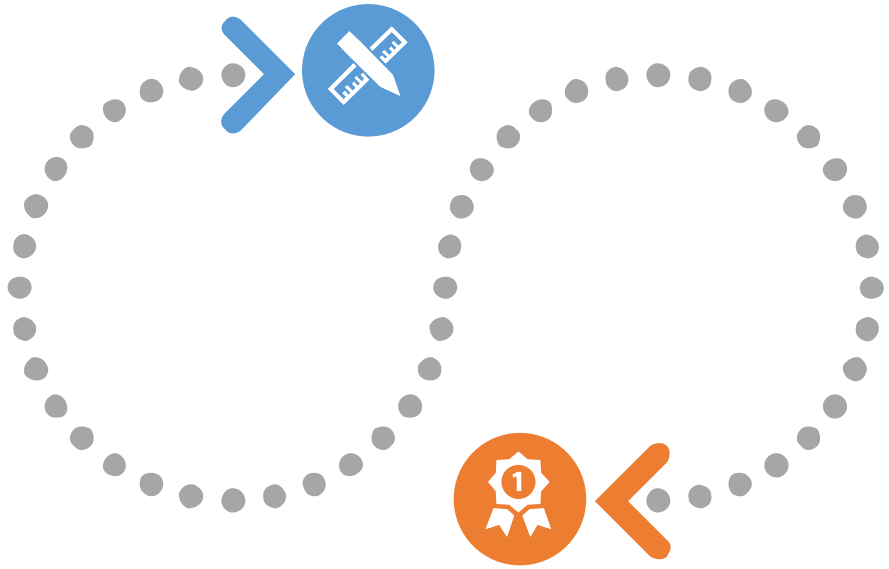
OTT Market Requirement

Outstanding User Experience

- High definition interactive content services
- Whenever & wherever anyhow three in one screen application
- Fluent and high-quality image quality
- More nature interactive experience
- Strong application expansion capability

Reliable & Stable Operation Platform

- High-capacity: Millions of user scale, Magnanimous contents
- High availability: Without single point of failure, Balanced loading, Distributed deployment
- High security: Support identification authentication; support anti-stealing-link
- Support multi-form: support various of forms from internet
- Low-cost network deployment and smooth upgrade



Our advantage

- Unique content delivery network (CDN)
- Optimisation of network capacity without compromising video quality
- Flexible approach to the needs of client infrastructure
- Real–time monitoring

Our advantage

Adaptive HTTP streaming

This technology lets adapt video quality both inside and outside operator's network (i.e. in third party networks where quality of data streaming and network capacity can't be controlled or managed).

CDN

CDN is a link that connects data transmission system and client devices and applications.

Depending on user's location Smart Routing Engine routes the user to the best located server.

Our advantage

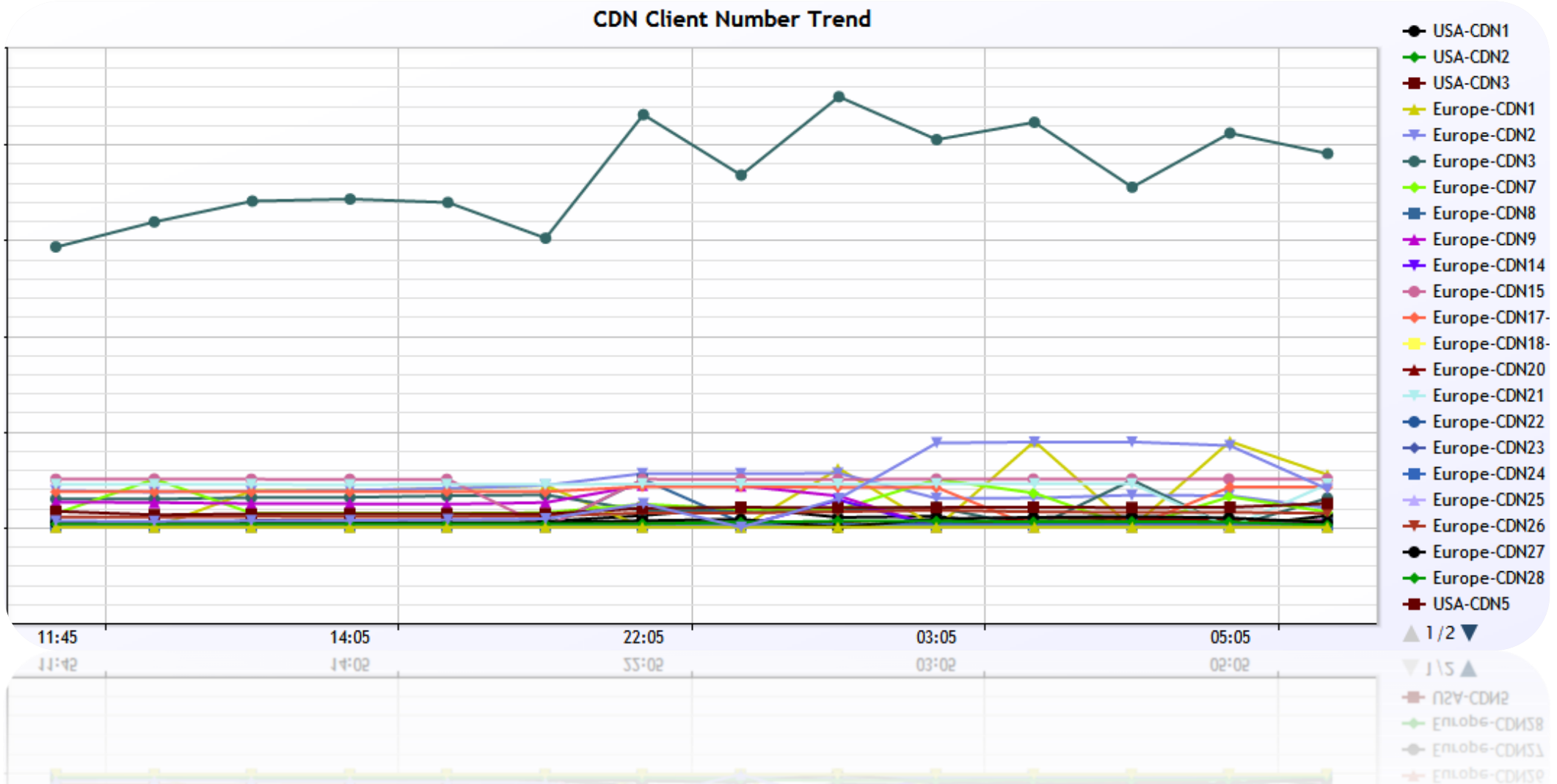
- √ Video ultra-compressiontechnology(H.265)
- √ Our compression technology stands out for its unique efficiency.
- √ Our OTT solution uses different encoding profiles and therefore is available on various devices.
- √ Network capacity requirements depend on the type of client's device and are within the following range: 0.3 — 0.7 Mbps for SD and 1.5 — 3 Mbps for HD.
- √ Technology developed by LifeStream has an immense potential and may be deployed extensively: TV streaming on mobile devices, OTT, nPVR and user generated content.

Our advantage

- Dynamic and flexible approach
- Our solution represents a unique balance between quality standard (meeting all the requirements of the largest telecom operators) and individual approach to every project.
- We are happy to provide recommendations from companies we are currently working with to demonstrate again efficiency of our approach.
- We can also provide recommendations with detailed track record and project description.
- Scalable solutions with reliability margin
- Our company and solutions we design stand out thanks to their scalable nature and reliability margin, which is proven by project we implemented for clients servicing large audiences in 11 time zones.

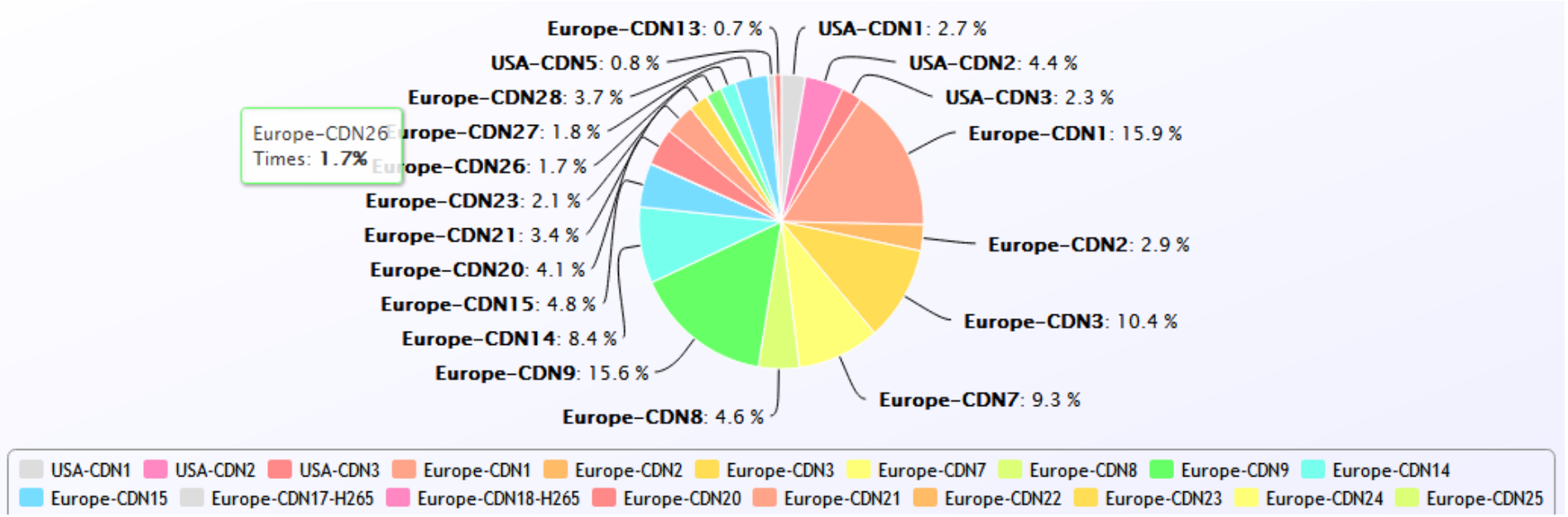
Monitoring

CDN Client Number Trend



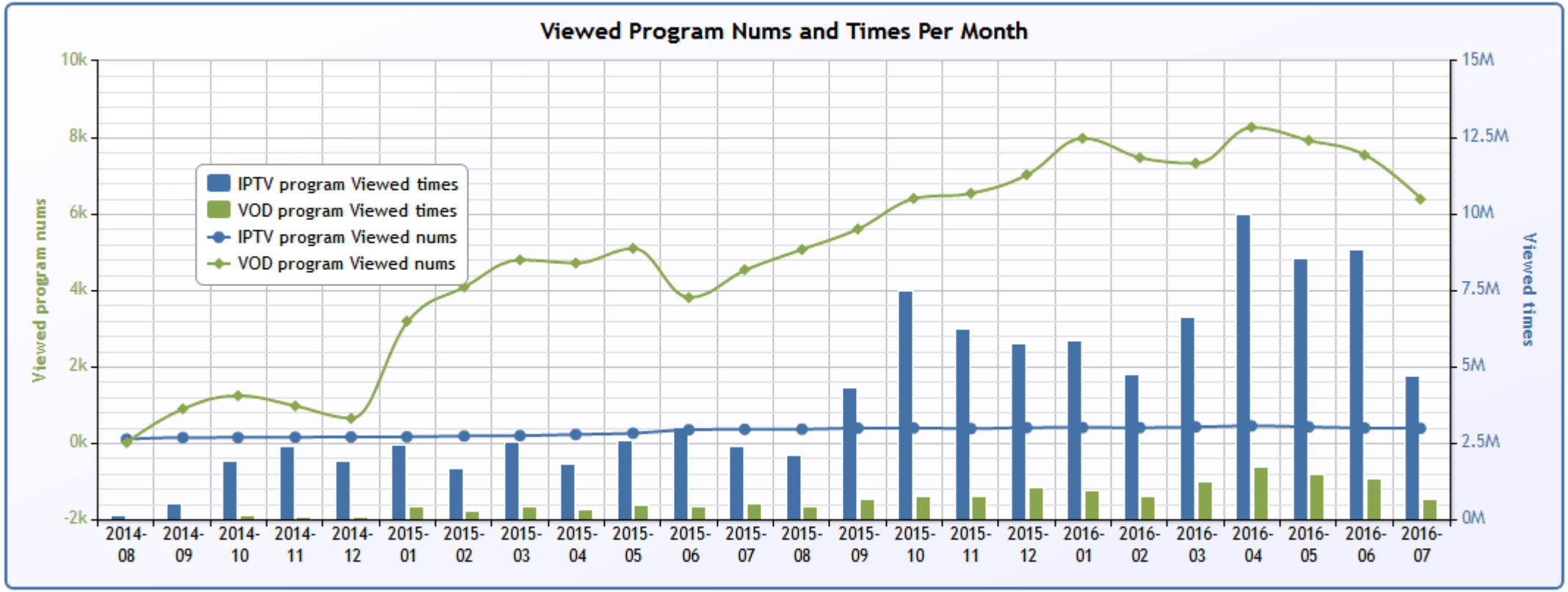
Monitoring

Program View



Monitoring

Program View



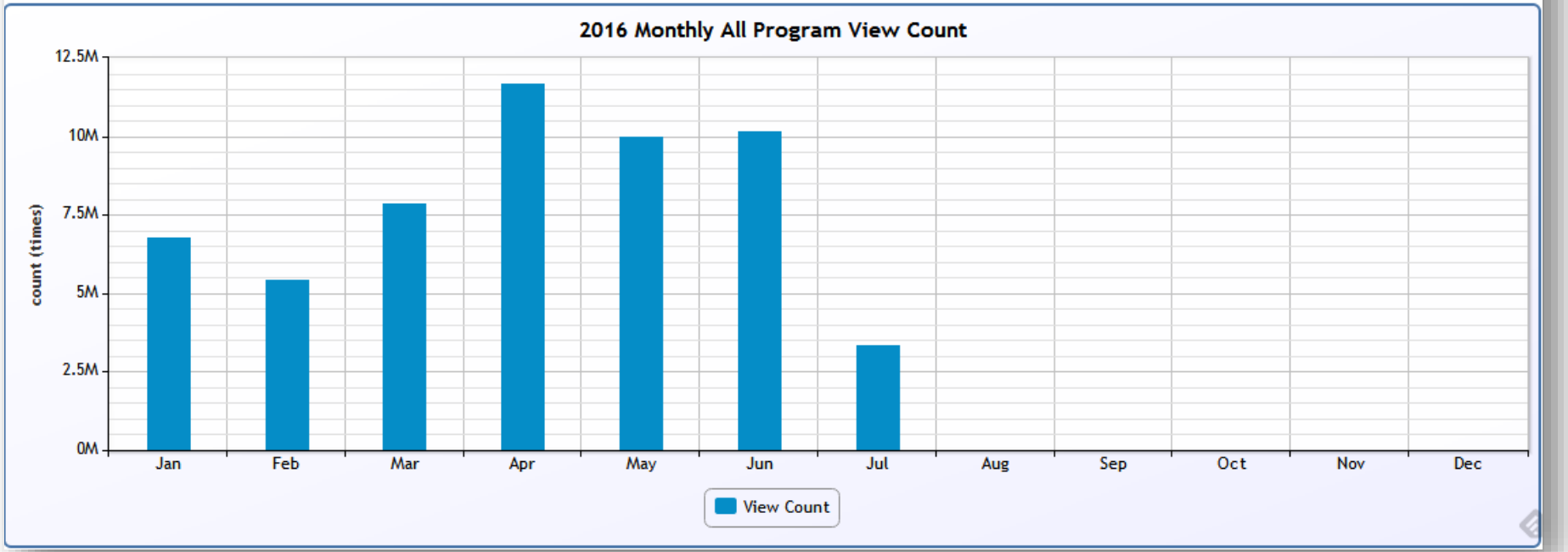
Monitoring

Program View

Classification_Name	Category_Total	Prog_Total	View_Count	View_Proportion
IPTV	14	506	103706625	96.70%
VOD	11	14055	3537377	3.30%

Page 1 of 1

View 1 - 2 of 2



End to End Solution

BOSS &CMS of sites

- Content management
- User management
- Service management
- Billing center
- Monitoring

Content Provider

•IP •TV •PC •Satellite •……	•MPEG4 •MPEG2 •H.264 •H.265 •……	•MPEG4 •MPEG2 •H.264 •H.265 •……	•RTMP •RTSP •HLS •…….	•STB •PC •Mobile •Phone

Terminal

Open Platform Solution

- System platform irrespective of media format
- Support MPEG2 TS streaming protocol

- Support to interworking with current OSS and billing system of operators
- Open DRM Architecture, support to integrate 3rd DRM

- Provide middleware of STB and system
- EPG and portal UI is based on standard WEB technology
- Apply standard protocol interface between equipments

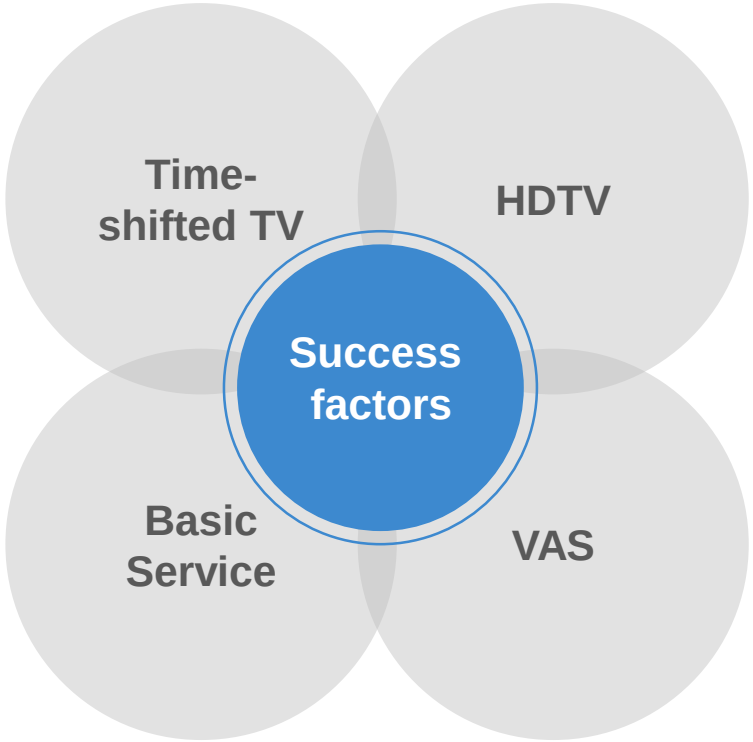
Open Platform

Strong Service Support Platform

Rich Interactive Video Service and Value Added Service

Time-shifted TV
- Time-shifted TV
- nPVR
- cPVR
- TVOD

Basic Service
- Live TV
- VOD
- Mosaic Channel
- My favorite
- Bookmark



HDTV
- MPEG2
- H.264
- H.265

VAS
- Interactive Game
- Interactive quiz
- Distance learning
- Vote
- TVMS
- Internet
- Karaoke
- Interactive discussion

System Redundancy & High Availability (HA)

High Availability

Contributions

Content Redundancy

Contents are replicated in slice on multiple MSN. All replicas are active to allow load sharing between MSN

Inter-MSN Redirection

In case of a MSN failure, NE redirects terminal requests to another MSN holding redundant content

NE Redundancy

All NE (ICMS, GSLB, MPT, CMT, NM, MSN) features 1+1 or N+M redundancy

Port Redundancy

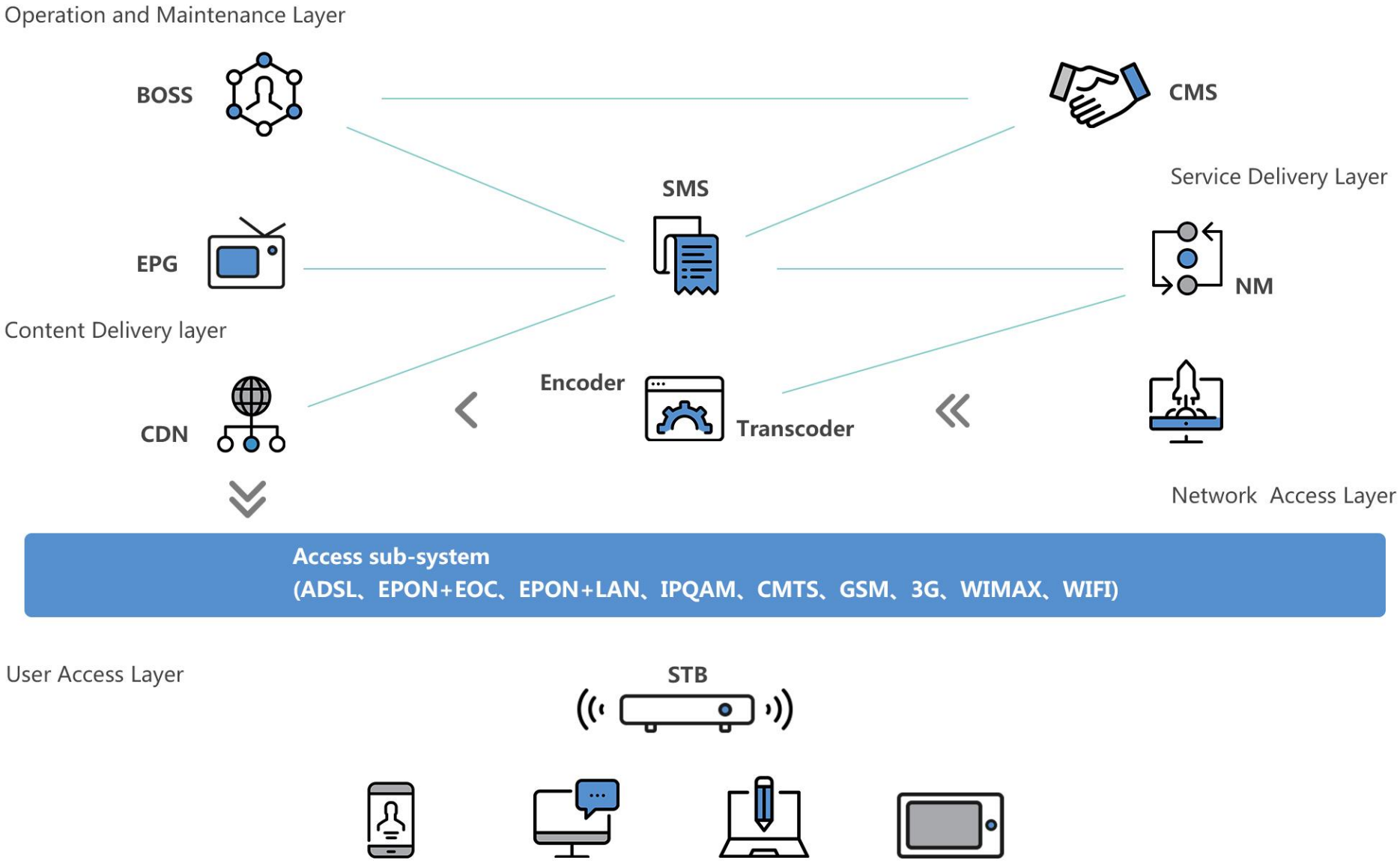
All MSN has 2 GE ports and features Port failover redundancy

Load Sharing

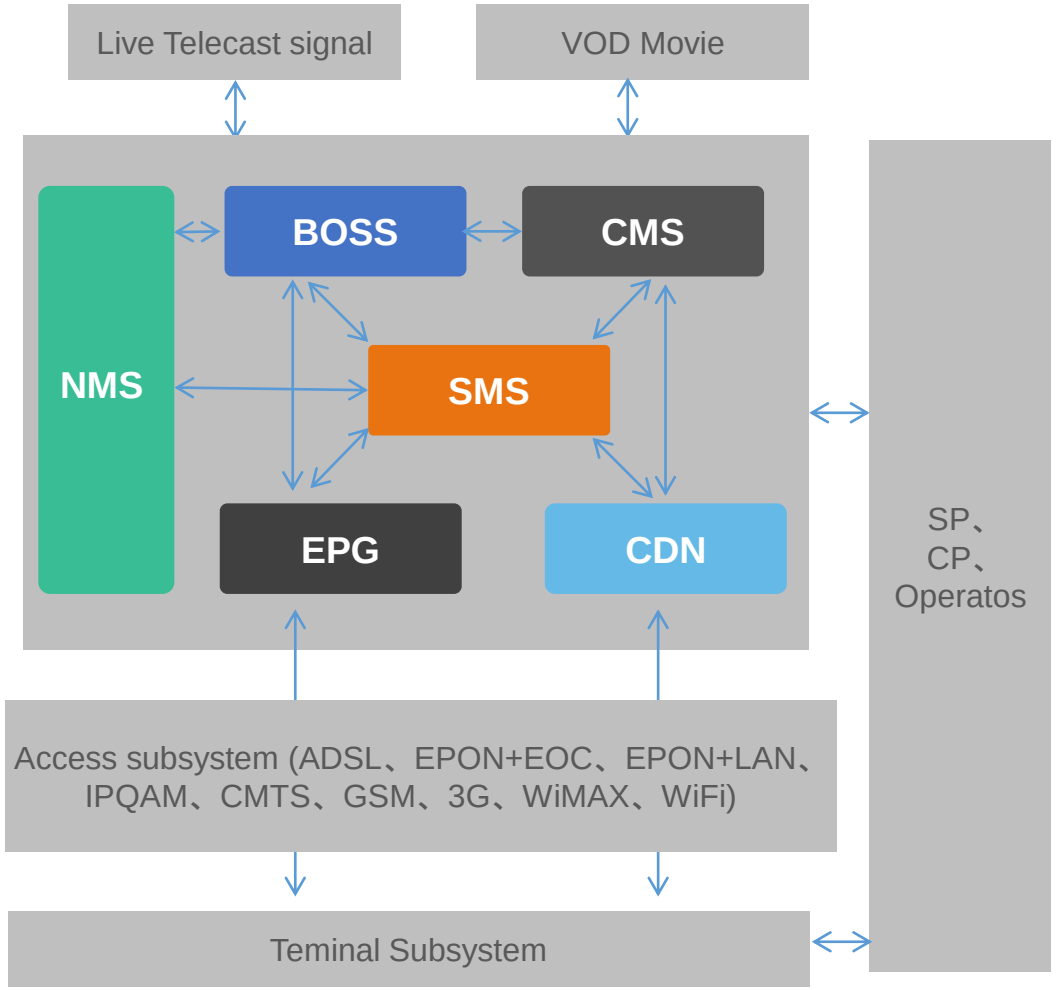
Load-sharing structure is adopted on GSLB, ICMS, MPT to maximize performance while providing mutual backups

» 02 Architecture of Ocean

Architectur of Ocean IPTV System



System Architecture



Core components of system platform

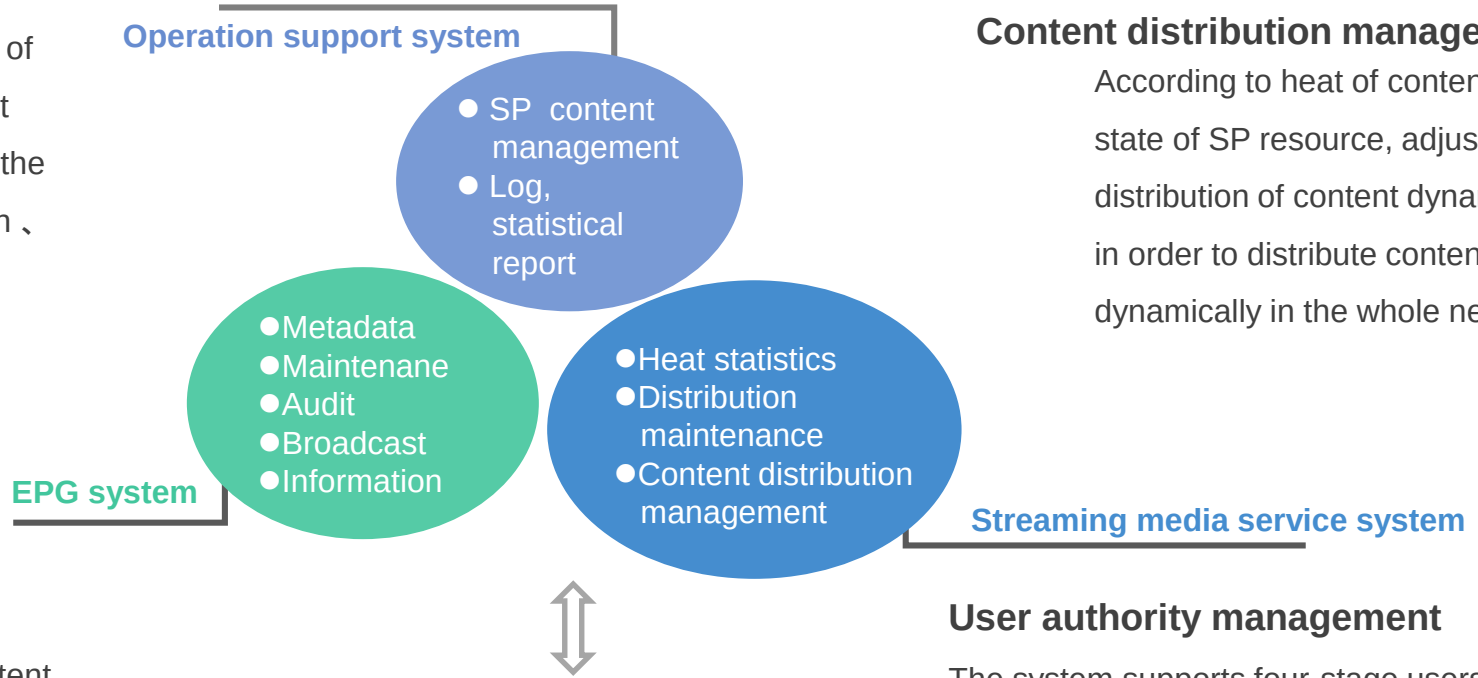
1. Content Management System (CMS)
2. Business Operation Support System (BOSS)
3. Service Management System (SMS)
4. Content Distribution Network (CDN)
5. Electronic Program Guide (EPG)
6. Network Management System (NMS)

Content Management System (CMS)

CMS | BOSS | SMS | CDN | EPG | NMS

Information management

Responsible for the management of content metadata, namely content description information, including the content audit、content distribution 、content maintenance etc.



Content distribution management

According to heat of content and state of SP resource, adjust the distribution of content dynamically, in order to distribute content dynamically in the whole network.

EPG management

According to the published content, automatically update EPG template and content, provide kinds of combined search criteria to positioning and retrieve according to given conditions.

User authority management

The system supports four-stage users, they are super administrator, operator, SP operator and SP administrator , each one is assigned different permissions.

BOSS - Subscribers Management

CMS | **BOSS** | SMS | CDN | EPG | NMS

- Subscribers account opening, activation, deactivation
- Service subscriptions definition, effective and query
- Support SOAP interface integration with the third party system
- Set subscribers' charging parameters
- Support content classification setting
- Support operation test account

Functions of service management subsystem for subscribers:

Provides a GUI for the service provider to maintain subscribers' information easily.

Details lists and service information query

Historical billing query

Purchase channels and content service

BOSS - Authentication Management

CMS | **BOSS** | SMS | CDN | EPG | NMS

Authentication

Supports username/password authentication, binding authentication etc..

Billing

Collects subscribers' original data (such as time and flow), generates records of consumption and submits to BOSS for accounting. BOSS will reconcile with SP, and pay with SP according to the settlement rules that development with SP/CP.

CP/SP management

Includes basic information management, life-cycle management, credit control management etc..

Statistical analysis

- Analyses basic information of subscribers, and provides corresponding report
- Analyses program resources, user demand info, and provides corresponding report
- Analyses marketing, and provides corresponding report;
- Colligation statistic based on other conditions, provides reliable basis for decisions
- Preprocesses and censuses the system data, improves processing efficiency of follow-up report.

CDN – Streaming Services

CMS | BOSS | SMS | **CDN** | EPG | NMS

- **Content delivery.**

  When used, CDN functions within service platforms grouped geographically and located in the closest proximity to end-user.

- **Offloading streaming servers.**

  Instead of addressing streaming servers clients are routed to CDN servers thus decreasing the load on broadcasting system.

- **Support of popular broadcasting formats.**

  Our solution supports all popular formats including widely used HLS system. We also support linear (live broadcasting) and nonlinear (including VOD) viewing. Also compatible with client apps.

Service Management System (SMS)

CMS | BOSS | SMS | CDN | EPG | NMS

Authentication

- Recording user bookmarks and collecting personalized information.
- Supporting STB access, AAA able to authenticate the user, and will based on the user group and other attributes assigned a list of the corresponding live channel after the authentication successfully.

Authorization

- When user request any content, AAA will base on the user and user's ordering relationship complete the authentication automatically.
- If the authentication is not passed, the AAA will base on the user's product package structure, return to the product list for the user to order to EPG, and guiding the user to complete the order.
- Once the order is successful, the AAA can record the order relationship automatically, and generate the order records.

Accounting

- And also be able to record, query the user log on demand, to generate a detailed list of user orders and billing.
- With billing functions, to ensure the billing result accurate and detailed.

CDN – Content Management |

- **Open architecture.**

  CDN is a link that connects broadcasting system and client devices and applications. Instead of addressing streaming servers clients are routed to CDN servers. Users are routed to Edge servers by Smart Routing Engine depending on users' geographical location and status of their networks.

- **Specifically optimised streaming network.**

  Video streaming network built especially for OTT and IPTV. CDN may also be used to transmit any static data like any conventional CDN.

- **Technology.**

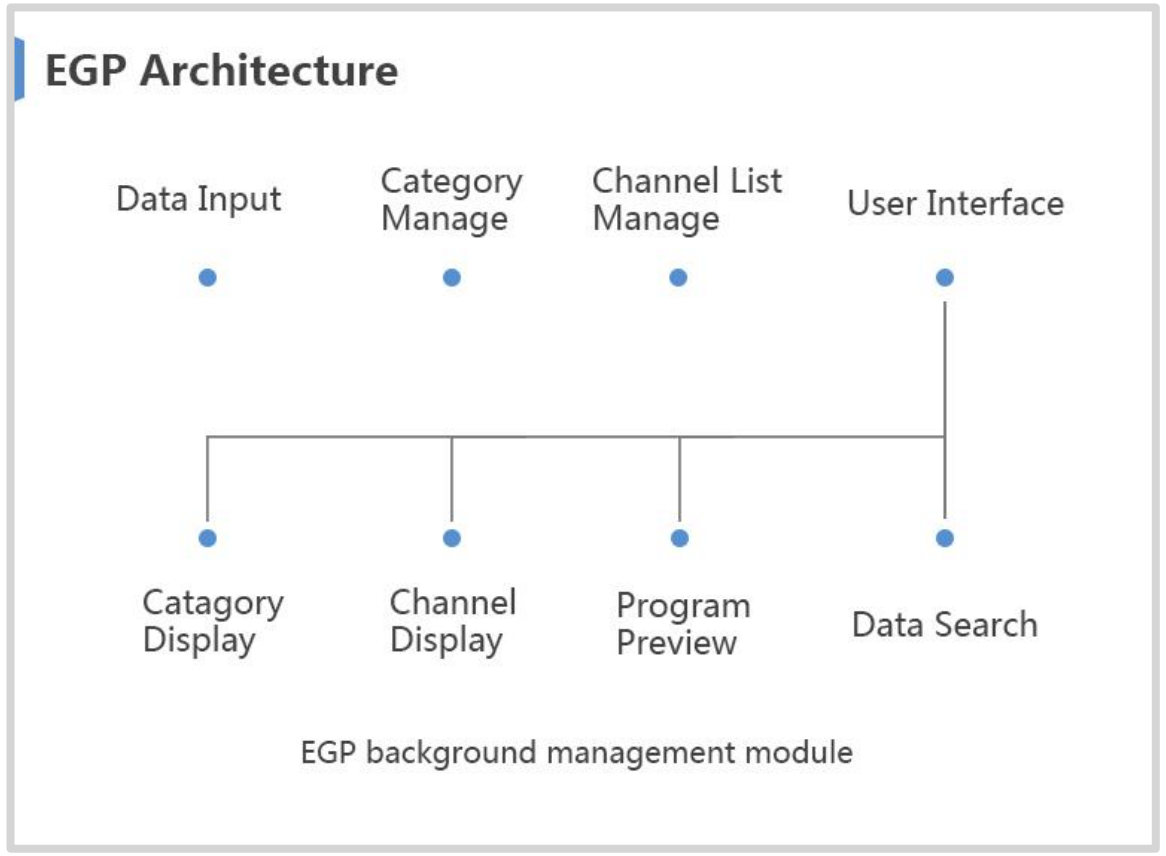
  CDN's Smart Routing System ensures the most efficient content delivery decision based on users' geographical location and status of their network. Our CDN ensures content transmission via service platforms located in the closest proximity to end-user.

Electronic Program Guide (EPG)

CMS | BOSS | SMS | CDN | EPG | NMS

The EPG subsystem provides for the end user consumption guidelines, the main functions include:

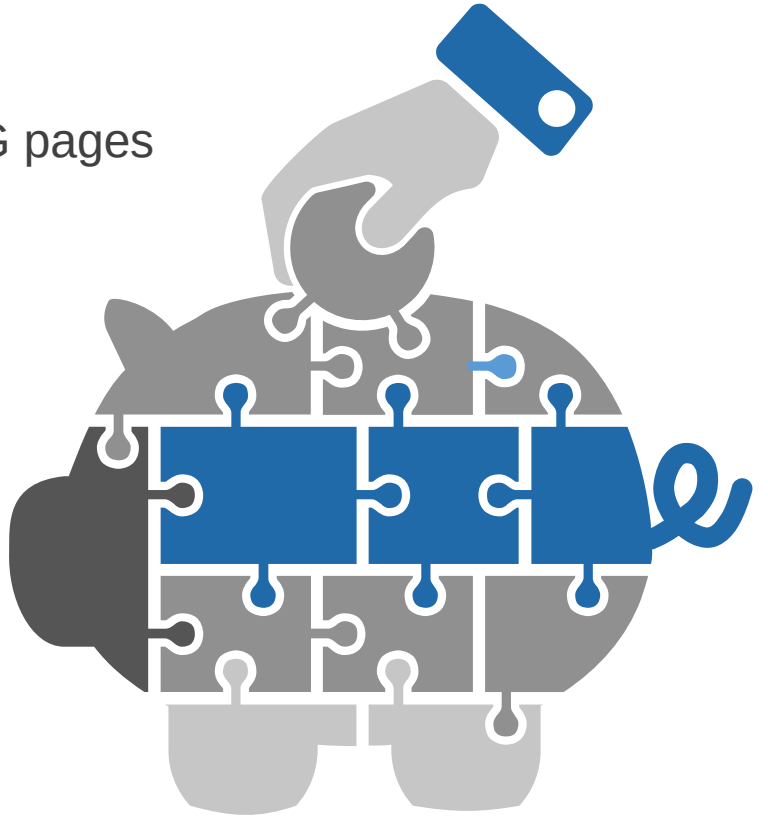
- EPG page function
- Program playlist function
- Show additional information function
- Program classification function
- Business search function
- Business navigation function
- Program reservation function
- Parental hierarchical control function



Electronic Program Guide (EPG)

CMS | BOSS | SMS | CDN | EPG | NMS

- The web-based EPG allows subscriber to browse and purchase programs. The EPG can be easily customized in different site, and subscribers in different groups are provided with different EPGs.
- Gets metadata information from NMDB and then generates dynamic EPG pages for subscribers. The EPG pages can be easily customized according to subscriber's demand.
- The EPG used for the streaming service is browser-based.
- Full motion video can be embedded in an EPG page.
  Browser page can also be overlaid on top of a full motion video.



Network Management System (NMS)

CMS | BOSS | SMS | CDN | EPG | **NMS**

- Abides by ITU-TM.3010 standard specification
- Abides by China Telecom IPTV2.0 standard
- Supports interface of Web Service
- Adopts Browser/Server structure, completely achieves network management functions that defined by international standard organization, such as TMN (Telecommunication Management Network), the functions include fault management, configuration management, performance management, security management and user management.

Network Management System (NMS)

CMS | BOSS | SMS | CDN | EPG | **NMS**

Fault Management

- Real-time alarm/ event monitoring, history alarm management
- Fault diagnosis and location
- Alarm filtering, severity define, confirm and clean up
- Automatic alarm and event processing, analysis of correlation and causes

Performance Management

- Real-time performance monitoring on PC server and streaming media service
- Performance management over-limit
- Statistics on performance , trend analysis and network optimization of network element

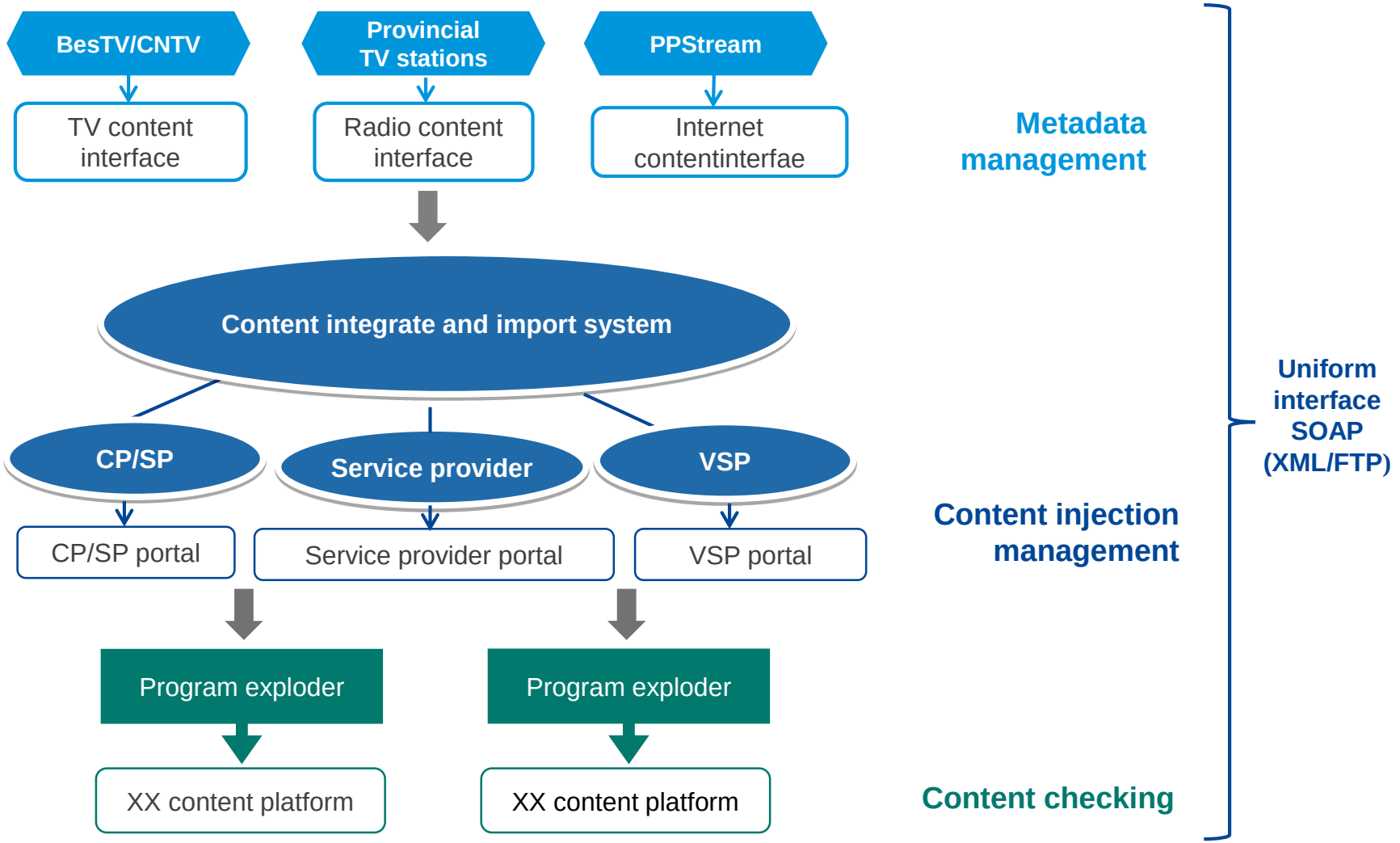
Configuration Management

- Automatic discovery and configuration management
- Software upgrade and patch management
- Control and file the ystem log and user operation log

Media Assets Management System (MAM)

- Program source through the Media Assets Management System, the Content Injection Management System and the Content Checking System can send the related service to every platform and program equipment.

- A process of the program source from input to output:
  Program injection system supports local channel services injection and third-party services integration, finally reaching the entrance of each business via a unified standardized data format SOAP.



Hardware Platform

CTLoader Cluster

GSLB Cluster

MPT Cluster

ICMS Cluster

HLC Cluster

HLS Cluster

Terminal

Content-Encoding Transcoding System:

- Real-time encoding, transcoding and transmission
- Analog and digital video input
- Support MPEG2, MPEG4, H.264, H.265 etc video encoding format
- Support MP2, MP3, AAC, WMA, AC-3 etc audio encoding format
- High bit rate (up to 6Mbps) and low bit rate (as low as 750kbps) video encoding
- Support hot swap and backup

Media Delivery System:

- Cluster based system design
- non-blocking service mechanism for large-scale users
- Support M3U8, RTSP, web service, mP2P, SDFS(GFS-like)
- Complete fault-tolerance

Terminal:

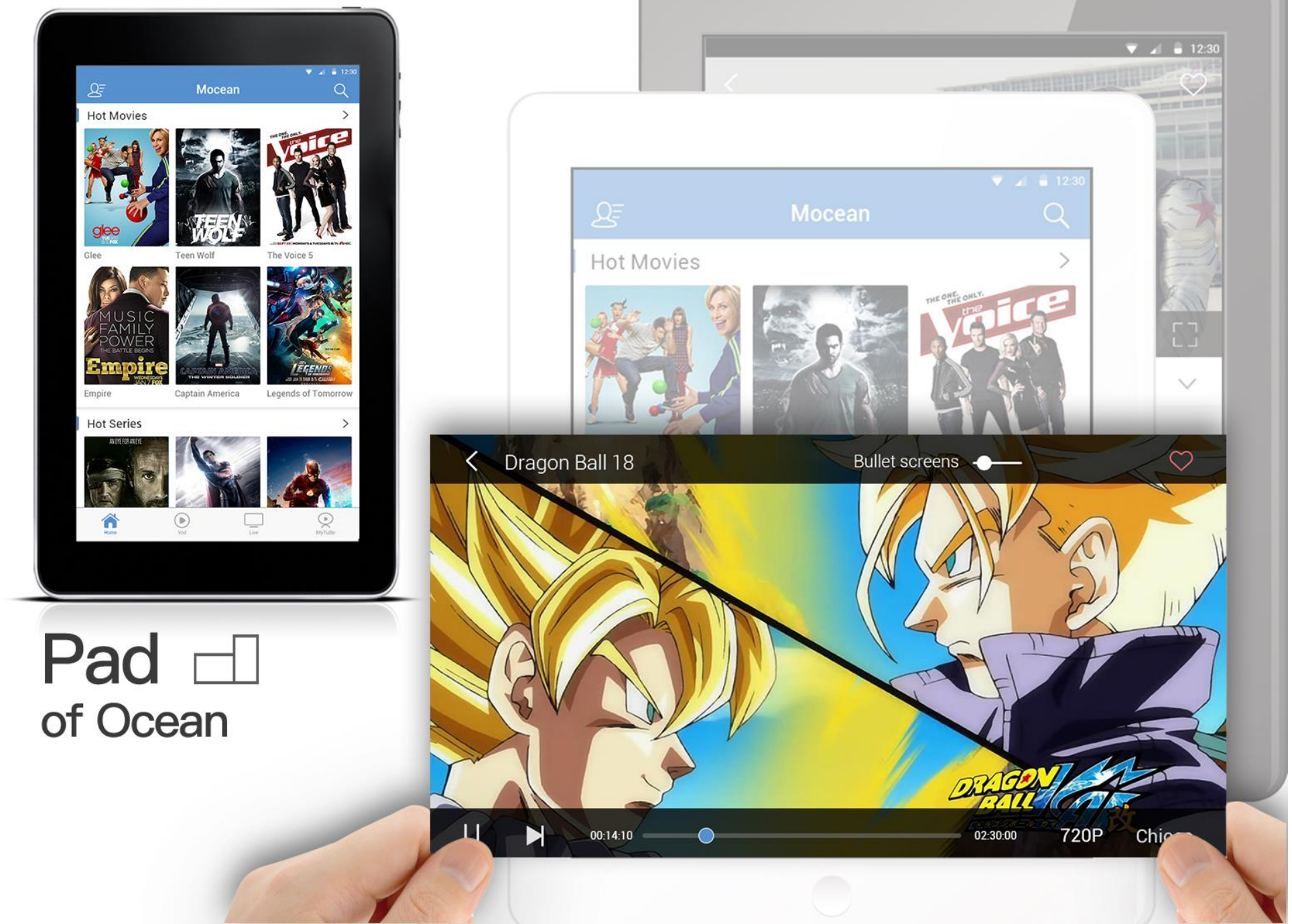
- Broadcast video quality
- Middleware based software architecture
- Totally online software upgrade capability
- Full HTML embedded browser
- Support video communication

» 03 Successful Case

Successful Case

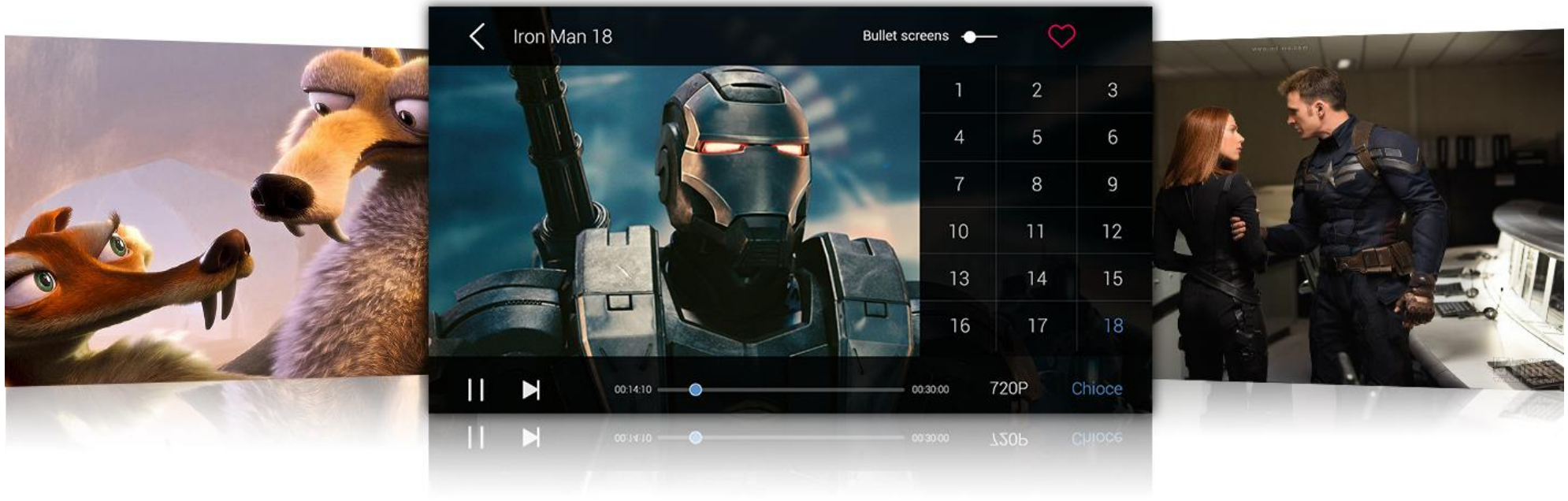
Client Of Ocean

Successful Case



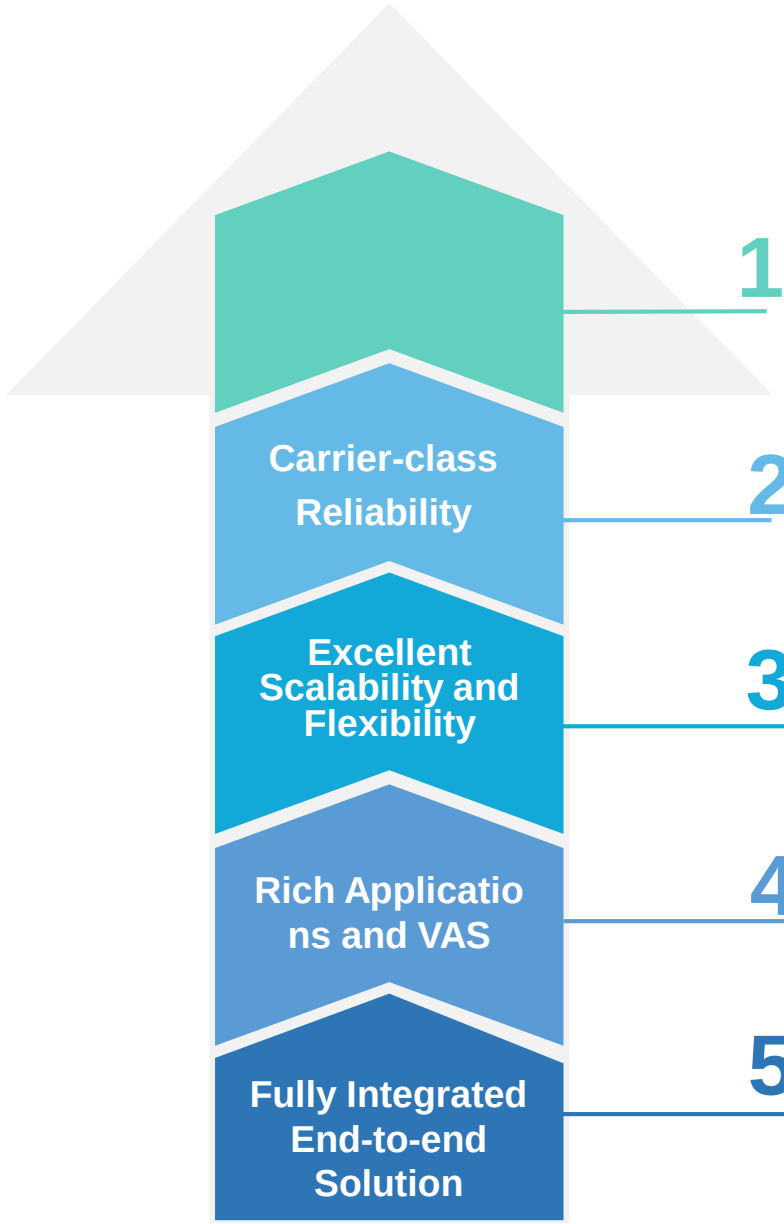
Successful Case

TV of Ocean



Movies Series MyTuBe

Successful Case



1st Intelligent content distribution/caching minimizes network overhead

2nd With chassis-based, Telco-grade comprehensive solution with system wide redundancy

3rd With distributed or central architecture, allowing incremental system expansion by either increasing the size of clusters or by deploying new MDS

4th Offer Live TV, VOD, Time-shifted TV, Network PVR, NVOD/PPV, Virtual Channel, gaming and etc.

5th With open system architecture, avoiding multi-vendor integration nightmare while allowing specific 3rd party best-of-breed vendor interoperability


Thanks