

The national converged cable service platform The China's Distributed Cable Cloud

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What's new in China

- Internet users: 731million
- Internet use on TV increased significantly
(accounting for 25%, an increase of 7.1%)



来源: CNIC 中国互联网络发展状况统计调查

2016.12



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What's new in China

- Cable TV: 223 million subscribers
- IPTV: 86.79 million, an increase of 89% compared with 2015
- Internet streaming services: 544.55 million subscribers



The market competition environment

■ Increasingly complex services

- Diversified user demand: 4K/Ultra HD, Streaming, Multiscreen interaction, SNS sharing, TV shopping, TV Pay, Smart home/IoT etc.
- Diversified form of service presentation: cross platform (TVOS/Android/iOS/Windows), cross multiple screens(TV/PC/Mobile/Pad)

■ Continuous competition from Telco and Internet

- Telco IPTV and Internet Streaming services expanding enormously



The market competition environment

- the existing traditional platform architecture of cable industry is **NOT** capable to adapt to the escalating demand of new services nationwide
- million user per province scale -> 250 million nationwide -> 1 billion nationwide, plus millions of application services
- converged media services, big data services, virtual TV/radio stations etc.

Convergence, technology and business trends

- Cloud Computing maximizes the capabilities of existing network infrastructure, construct “All-in-one” flexible platform to offer Video/Broadband accessing/Application services.
- Cloud Computing is an appropriate tech utilized to support the all-service operation of cable network operators.



CBN strategy of cable services



“CHINA” mode : **C**omcast + **H**ulu + **I**nternet + **N**etflix + **A**amazon



- All-service operation: Video+Broadband accessing+Application
- Core Superiority: Media Convergence
- Platform operation: Open interface, Content operation
- highly manageable, under unified supervision
- orderly competition: Market-oriented, large-scale, resource-sharing



CBN MSO platform deployment

CBN Integrated Service Platform (content、service、operation)

Video service cloud

integration service platform

Business & Operation Support System

Media cloud

Content management system

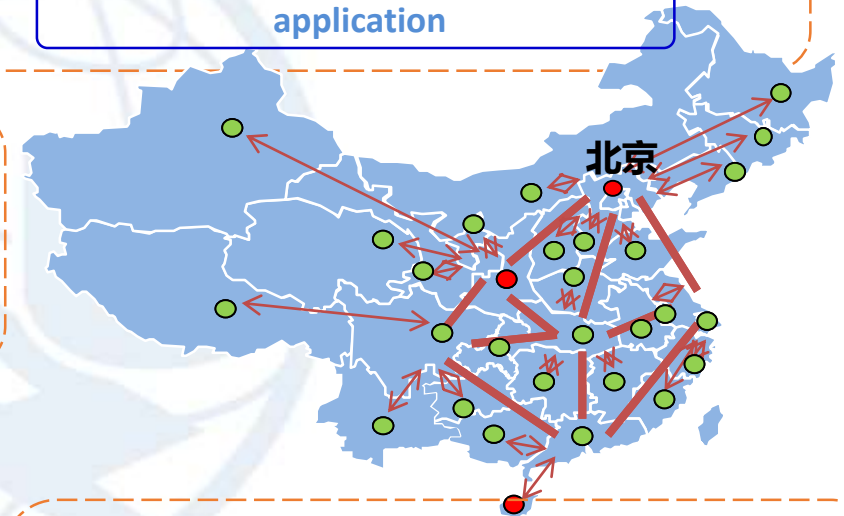
application

Flexible IT cloud platform

- nationwide cloud data center in Beijing, Xi'an and Nanjing
- IaaS/PaaS services for cable services

optical network

- ✓ Backbone transmission network
 - 10G、100G OTN, 455 nodes of nationwide network
- ✓ IP backbone network
 - 6 core node、31 backbone node、3 NAP node、10 direct connection node, covering the whole country
- ✓ CDN

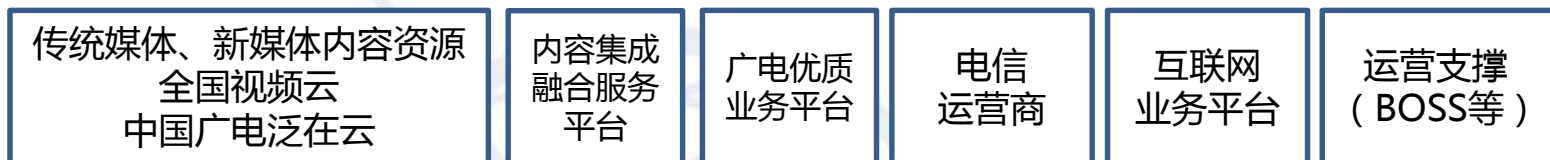


Access network and terminal deployment

- Hainan、Shaanxi、Shanghai、Jiangsu、Zhejiang etc
- FTTH, cable network
- New smart terminal、APP services
- All new audio visual、application and interactive experience

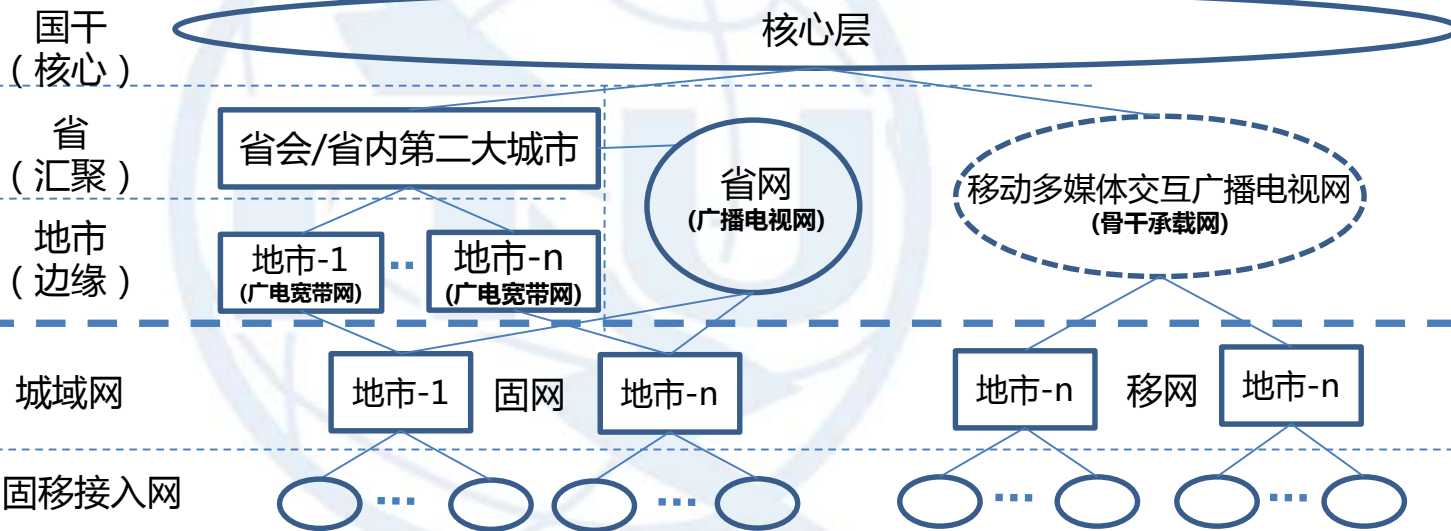
Hierarchy of Wired and wireless converged cable service platform

1. Distributed cloud



2. converged broadband Network (IP broadband & multimedia

骨干网络设施



mobile broadcasting network)

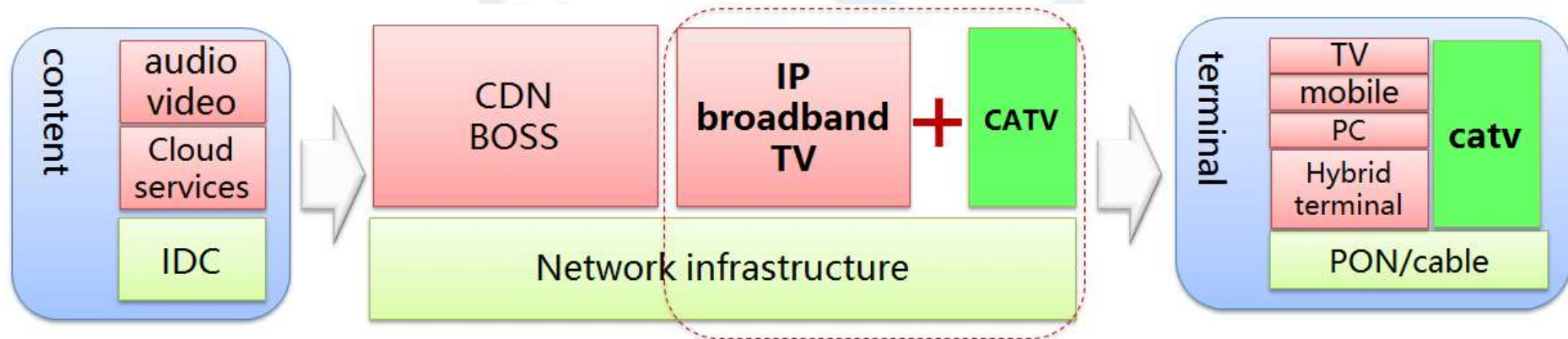
省内网络平台

3. smart terminal



Broad cable TV infrastructure

- as a Multiple Service Operator, CBN provides OTT services on cable network, named broadband cable TV
- Customer can get IP streaming video, broadband access, and integrated information service.

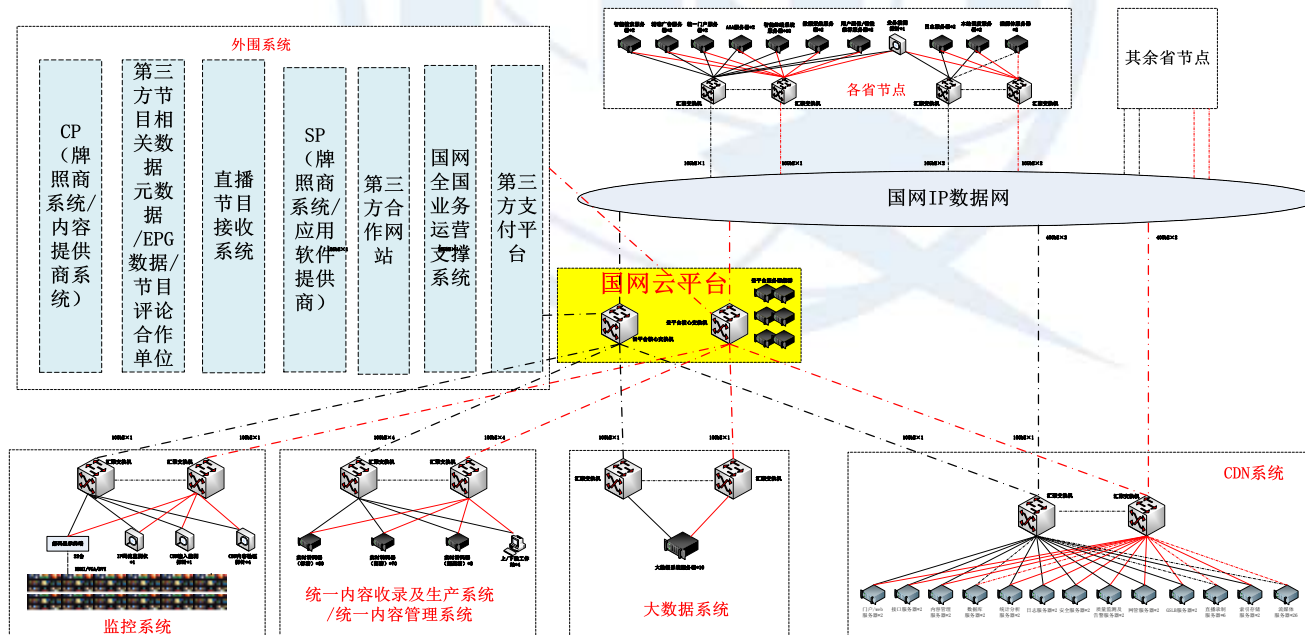


Strengthen the cable TV integration service capability

- seamless evolution to support servicing 200 million customers
- offer premium services utilizing distributed storage/big data/cloud computing technologies, based on UHD STB(TVOS/Android)
- Content processing capability: 200,000 hours
- Live, VOD, time-shift, DVR, precise recommendation etc.
- Big Data analysis, Intelligent advertising, App store, device management, TV gaming, video call, news, weather, music streaming

Strengthen the cable TV integration service capability

- Focus on the construction of CBN Cloud Platform including CDN, Content Management System, Big Data System, Monitoring System etc.
- Multiple third party systems including Content Provider, Service Provider, EPG distributing system, BOSS, online payments systems etc.
- Deploy sub-platforms across provincial nodes.



Deploy Net Traffic and big data analysis system

- construct end-to-end, device-to-service, data-to-operation data acquisition&analysis system, which fully covers all-service and all-data
 - All-service:Live, VOD, time-shift, Mobile APP etc.
 - All-data: terminal data(STB, Mobile APP), user behavior data, user profile data, BOSS data, geographic information data etc.

Create Innovative Business Forms

- **New Audiovisual:** content integration, multimedia and services.
- **New Application:** Implement TV Video Call system, social network, News/Fitness/FM/Music/Weather/Cooking Applications
- **New Experience:** Support multiple screen interaction (TV/Pad/Mobile). Provide cross-platform App (TVOS/Android/iOS)

System Trial: CBN Integrated Service Platform

- **Integration of service and business resources**
 - ① **Integrated Media Service Cloud Platform Trial**
 - **Build prototype system, achieve seamlessly connection to smart TV devices**
 - ② **end-to-end QoS and service scheduling mechanism**
 - **perform interface tests on services, data traffic and system management based on the BRAS(Broadband Remote Access Server) located at MAN service access node**
 - **Perform tests on the Dynamic Bandwidth Allocation(DBA) feature.**

System Trial: CBN Integrated Service Platform

■ Integration of service and business resources

③ integrated video service system trial on multiple terminals

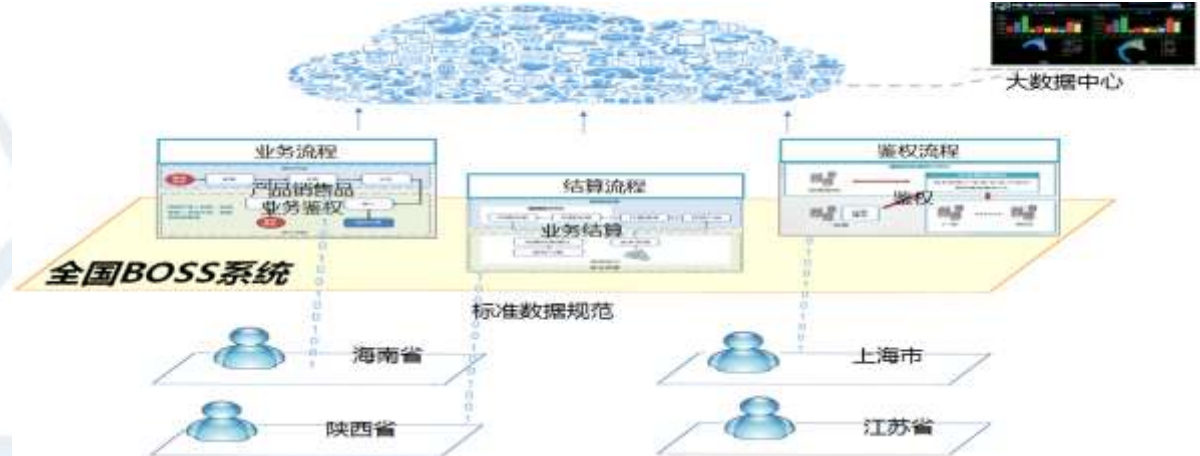
- the integration scheme of streaming system which is based on HLS(HTTP Live Streaming) /Microsoft Smooth Streaming/MPEG-Dash(Dynamic Adaptive Streaming over HTTP)
- video bitrates includes 800Kbps/1.5Mbps/2.5Mbps/4Mbps/8Mbps
- perform service tests on multiple mobile phones and STB terminals

④ CDN Trial

- implemented test systems, completed CDN trial on all the servicing nodes
- Provide technical support for the integrated delivery of radio/TV services and Internet services.

Deployment and Trial of BOSS system

- Central system deployment: completed the deployment of central BOSS, central payment platform, big data analysis system
- with local BOSS systems, certification/authentication
- initiated the construction of national central BOSS



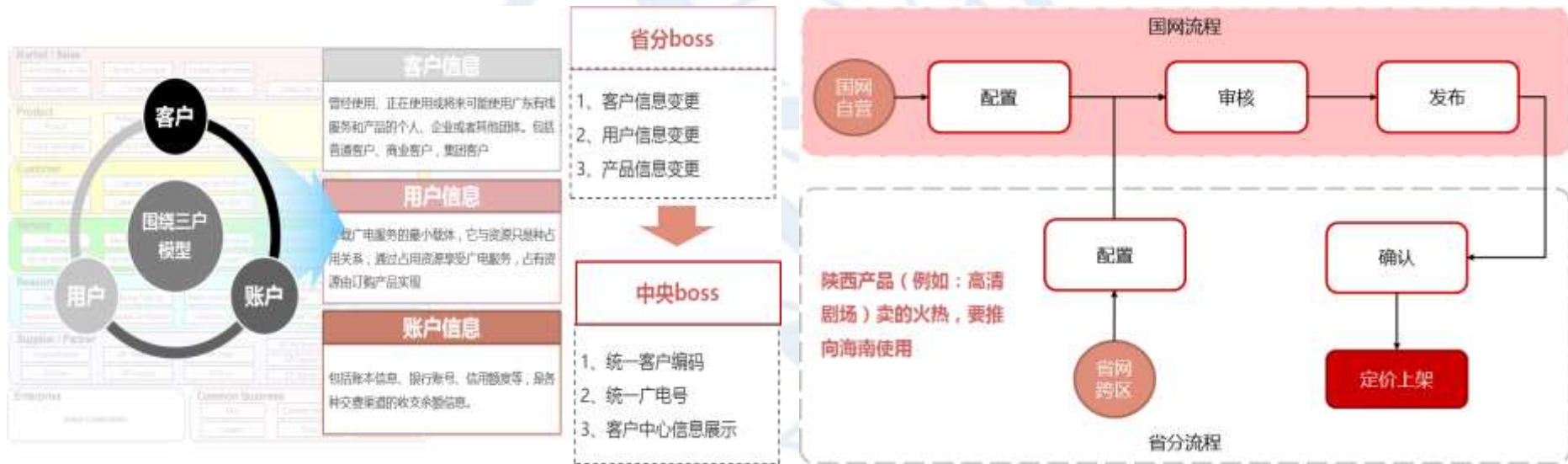
■ summary:

- ① completed the interface specification of central data platform and provincial platform
- ② constructed customer data platform
- ③ constructed the core settlement/clearance engine
- ④ constructed the business analysis platform for data operation
- ⑤ unified payment platform system architecture
- ⑥ completed the development of BOSS system

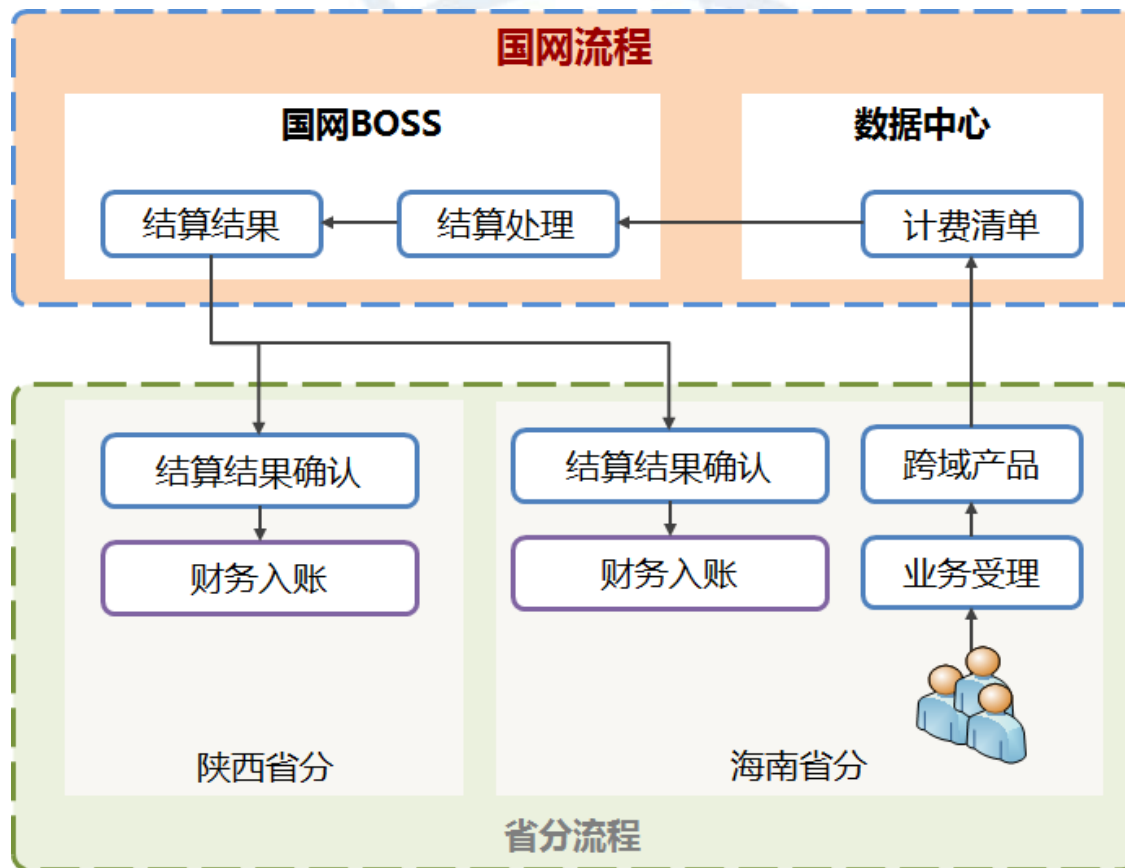
completed the interface specification of central data platform and provincial platform



constructed customer data platform

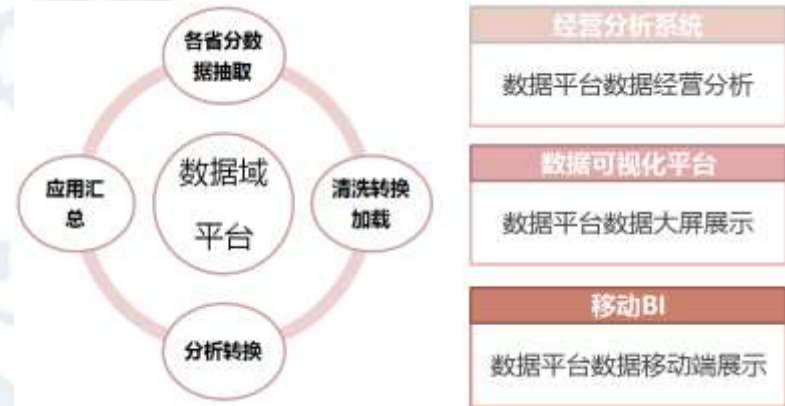


constructed the core settlement/clearance engine



constructed the business analysis platform for data operation

- Data operation platform

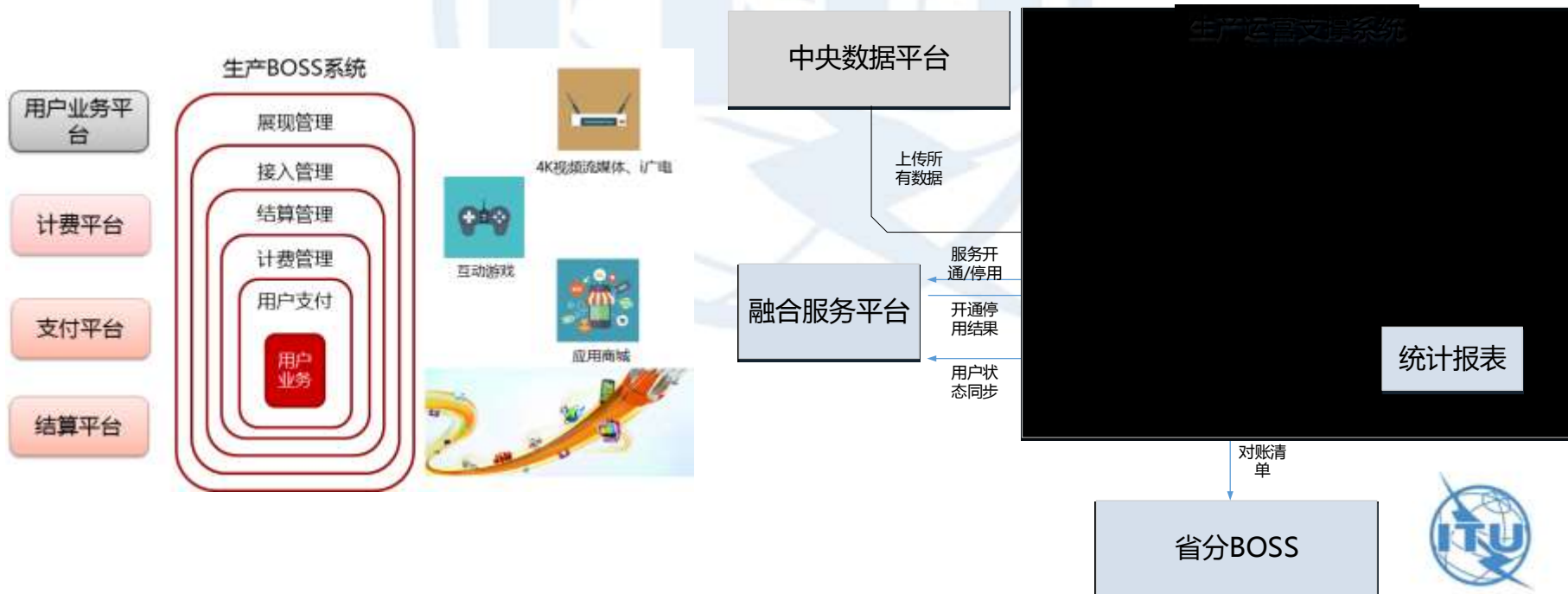


- Business analysis platform



completed the development of BOSS system

- Integration Architecture of the Operations Support System
 - Hierarchical structure development and design
 - system is internally loosely coupled
 - flexible and instant response to the business demands for system changes



BOSS system trial

■ Settlement/clearance, certification and security system

① BOSS system trial

- system trial on B2B platform and B2C certification center
- differentiated method, for various business agreement
- account system according to the AAA architecture. unified account management, authentication/control/audit.

BOSS system trial

- Settlement/clearance, certification and security system
- ② Operation and audit system
 - identity verification procedure for SSL VPN and IPSEC VPN remote login
 - the IPS and anti-virus filtering feature.
 - support the demand for secured operation of the nationwide-operated service.

cloud services

- Consolidate the IaaS and PaaS capability, innovate SaaS services, support the upgrading of industry transformation. Based on reliable cutting-edge technologies, construct cloud infrastructure that serves nationwide industries.
- 1. **Network reconstruct/reconfigure:** use Cloud Computing + SDN / NFV reconstructing base network architecture, focusing on IaaS layer resource aggregation and PaaS layer capability offering
- 2. **Business mode reconstruct:** innovate SaaS services servicing all industries according to CBN “CHINA” mode

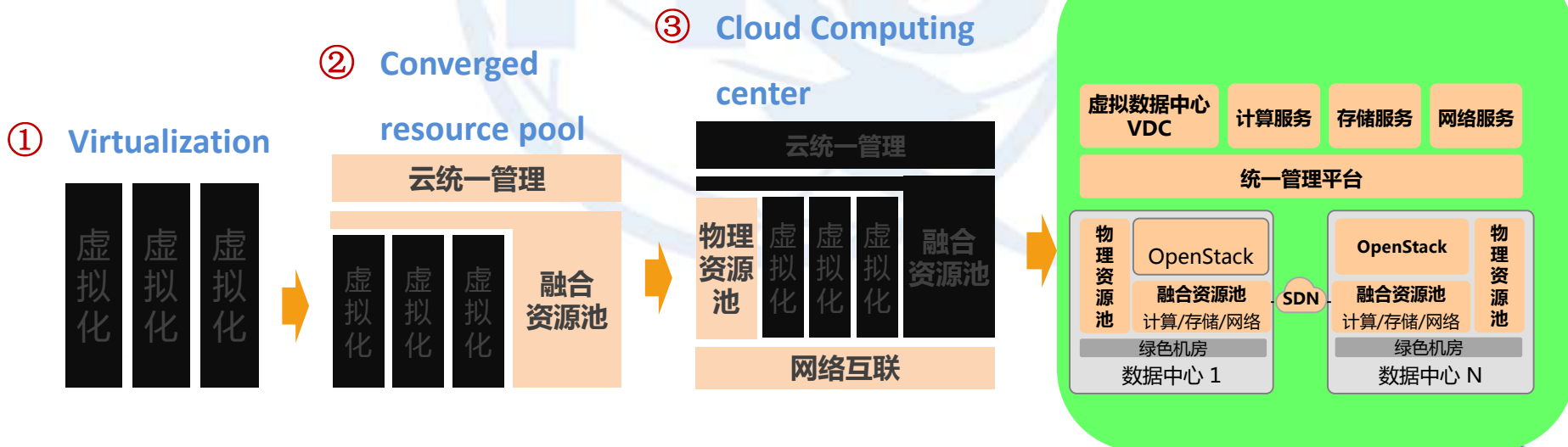


Distributed cloud computing center

1. Network reconstruct/reconfigure: construct distributed cloud computing center

- implement nationwide distributed cloud computing center, based on the seamless upgrading of existing industrial resources
- data center routine evolution roadmap

④ CBN option: Distributed cloud computing center



Distributed cloud computing center

- focusing on IaaS layer resource aggregation and PaaS layer capability offering

- 1st phase pilot project completed. CBN distributed cloud platform including

PaaS and SaaS services is being constructed



Distributed cloud computing center

① initiate the nationwide cloud data center

construction in Beijing, Xi'an and Nanjing,
encourage provincial cable networks to share
their own cloud platform resources, and
promote the interoperation between platforms

② Strengthen the cloud network collaborative

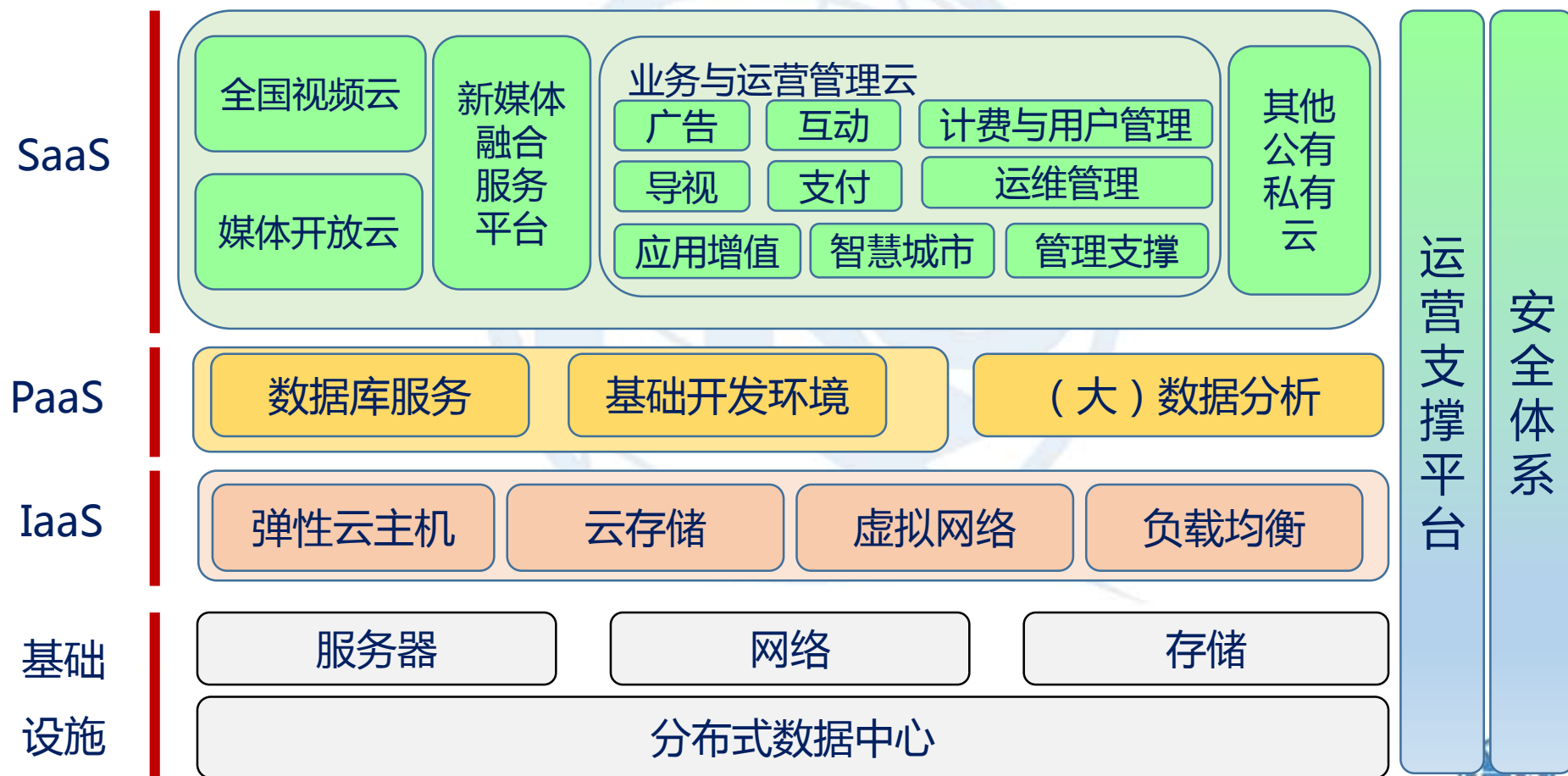
deployment, achieve cable network broadband

"network as a service" NaaS



New Infrastructure of CBN platform

- currently support CBN bussiness, public cloud services offering is being planned



Openstack is adopted as CBN Cloud Platform OS

- Open source is critical for the cloud platform: significantly reduce the cost.
Openstack community is widely recognized by the industry.

- Standardization

- Openness

- Integrity

- Maturity



Implement distributed management and hybrid networking, utilizing SDN/NFV

① for CBN business demand: network virtualization, cross-domain vDC

services

DC间网络互联

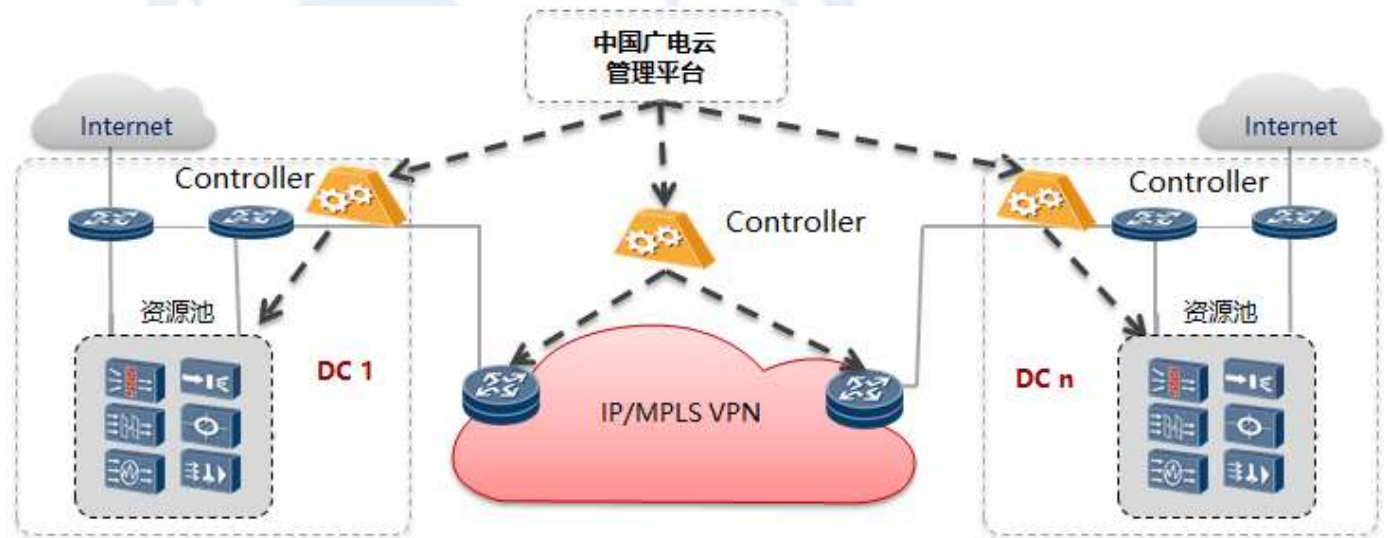
- 基于二层或三层VPN专线互联

DC间虚拟池化

- 标准云OS，实现网络与计算、存储资源系统统一编排

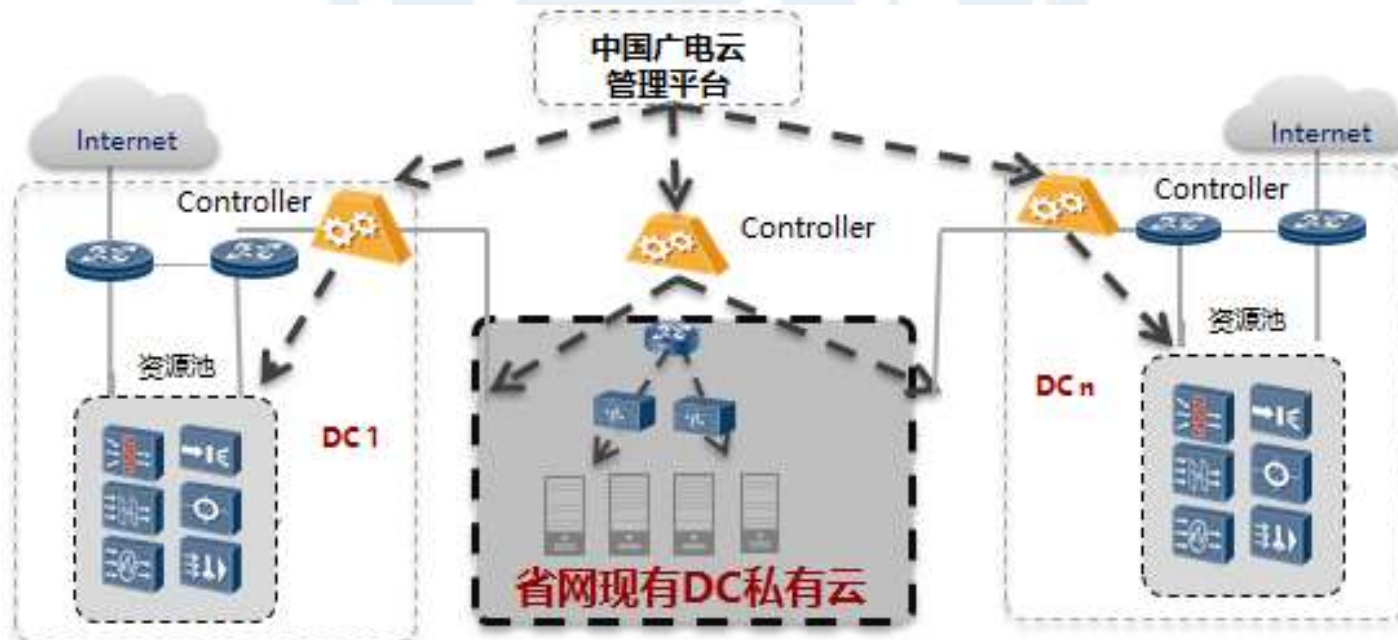
DC间运维管理

- 统一运维管理平台



Implement distributed management and hybrid networking, utilizing SDN/NFV

- ② For the nationwide cloud data center resource aggregation, enhance the industry cloud service capability: implement hybrid cloud services based on SDN/NFV+VXLAN



Implement distributed management and hybrid networking, utilizing SDN/NFV

③ for enterprise customers:, offer more flexibility to bussiness



Implement distributed management and hybrid networking, utilizing SDN/NFV

■ Medium and long term evolution: Reconstruct cable network infrastructure

utilizing Cloud Computing and SDN/NFV

① Network “Cloud--ization”

- DC-centric ICT infrastructure
- SDN & NFV

② Business “Cloud--ization”

- end-to-end ICT business based on cloud
- on-line 24/7, real-time on demand service

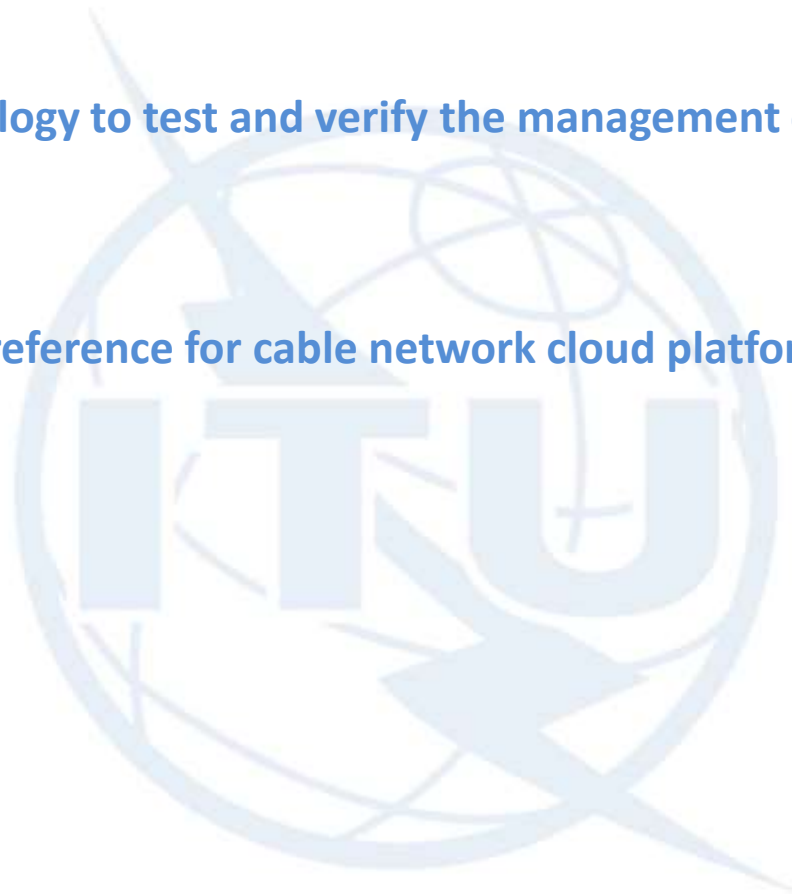
Cloud Platform Trial

- ① Customized development on cloud platform such as sub-domain, service catalog, topology etc.
 - IaaS layer R&D based on Horizon Architecture
 - cloud resources for nationwide broadcasting organizations.

- ② Cloud OS Standardization based on Openstack
 - completed the analysis and comparison of Cloudstack, Openstack, VMware vCAC technologies
 - Build simulation system to perform compatibility tests.
 - support the standardization of national cable network cloud platform.

Cloud Platform Trial

- ③ utilized SDN technology to test and verify the management of virtualized network resource pool
- Provided technical reference for cable network cloud platform interconnection.



Cloud platform for video service

- Multi-screen support: delivering video services to all devices, offering personalized video anytime and anywhere on any devices



All new audio visual 、 application and interactive experience

■ User-Interface



All new audio visual 、 application and interactive experience

- Unify the content search and supply of the TV, mobile and PC screens



All new audio visual 、 application and interactive experience



重构你的电视生活
TV2.0 @everywhere

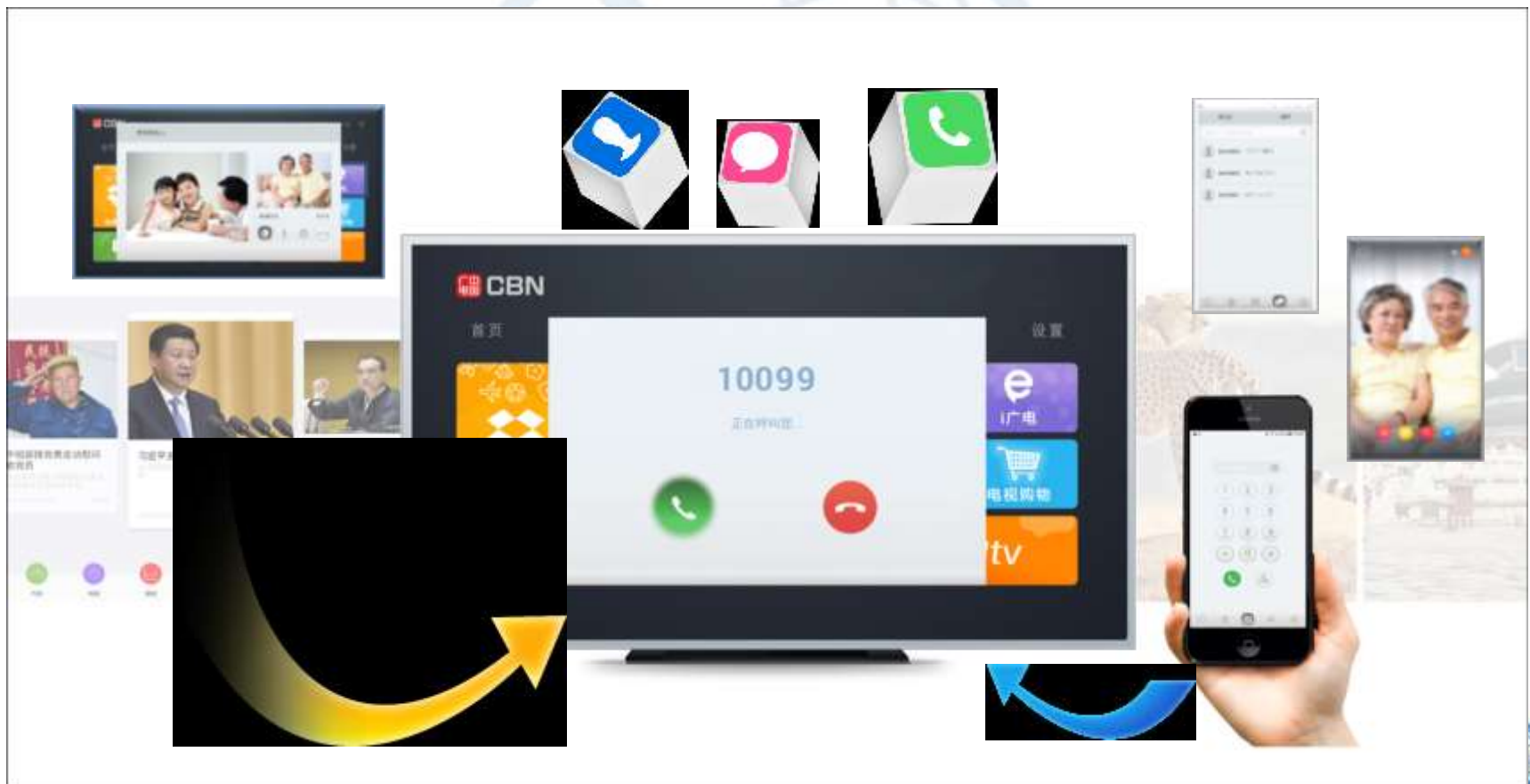
All new audio visual 、 application and interactive experience

- Online games and open courses on TV



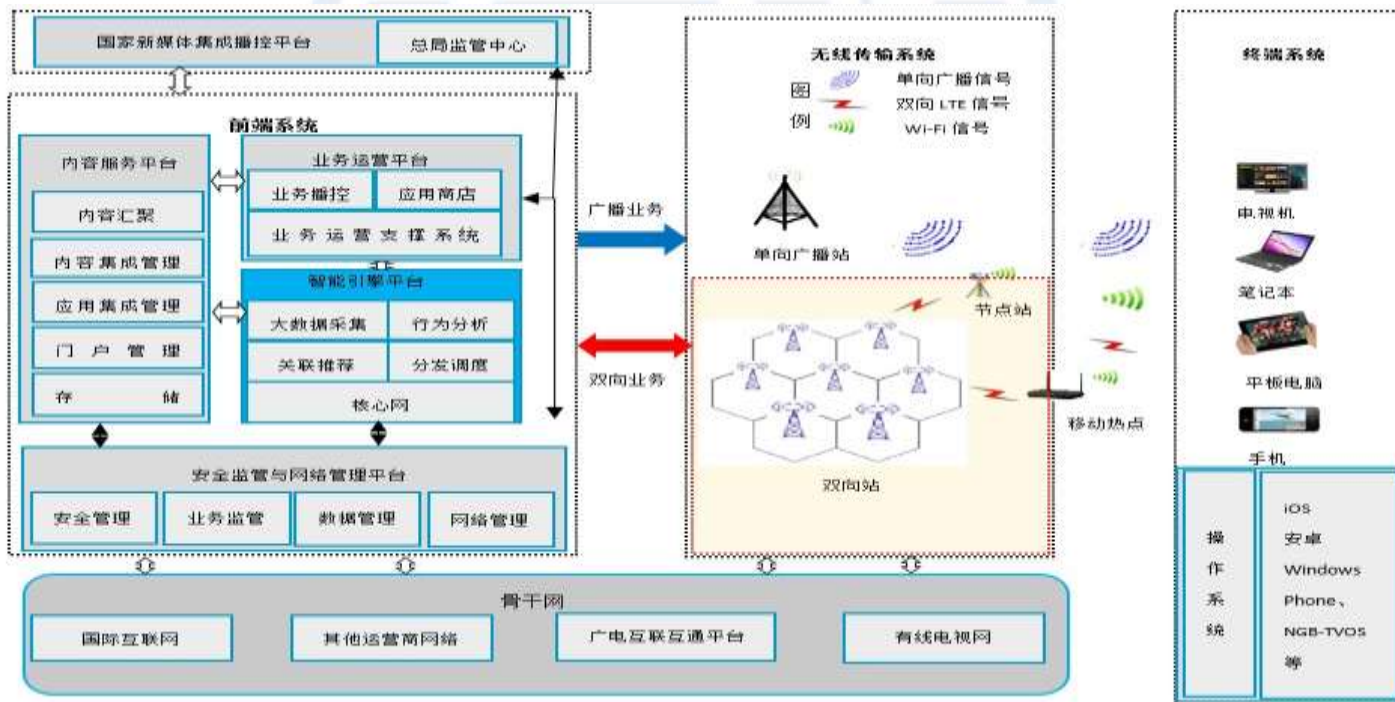
All new audio visual 、 application and interactive experience

- Social network application on TV



All new audio visual 、 application and interactive experience

- CBN is planning to construct nationwide mobile network, interactive multimedia mobile broadcasting network, to provides multi-screen play services anytime and anywhere.



All new audio visual 、 application and interactive experience

- Mobile services (live tv streaming)



All new audio visual 、 application and interactive experience

- Mobile services



All new audio visual 、 application and interactive experience

- Mobile services (advanced search、app)



