Launching a state-of-the-art OTT Video offer for Telecom and Pay-TV operators





Executive summary:

In this paper, we show how an operator's business benefits from OTT Video opportunities, how to handle the complexity of outsourcing, why Globecast is the right integrator and managed service provider. In addition, a technical focus provides a clear guide to OTT TV technologies' evolving landscape.





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OTT Video is a must have for operator strategy

Market-proven project benefits for telecom operators (broadband, mobile, MVNO), cable MSOs and Pay-TV bouquet operators

Keywords:

Churn, Loyalty, ARPU, Super Aggregator, Eligibility, Advertising

Customers expect a modern and rich video service that includes linear television channels, video on-demand content and highly desirable third-party OTT video services. Given the ongoing rise in OTT viewing, driven even faster by the events of global health crisis, it's a strategic time for operators to launch or reboot their OTT video service. This strategy will quickly bring benefits:

Reduce customer churn

>> Subscribers are willing to stay when they're happy with the content proposition, the modern user experience and the available services. So, the operator needs to give them the Netflix and YouTube apps they want, as well as the expected line-up of basics/premium/thematic channels they anticipate finding, via the operator TV set-top box and any Internet-connected device, at home and on-the-go. >> By providing access to the right content and rich TV services, whatever the device used by the subscriber (**TV Everywhere** experience), the operator will generate customers satisfaction and loyalty, resulting in renewed subscriptions.

Increase ARPU

>> Operators will generate new revenue streams, acting as commercial distributors for Netflix, Amazon Prime Video, Disney+ and other third-party OTT Video services, providing an easy subscription journey and a trusted payment path via carrier-billing: that's the **Super Aggregator** strategy.

Address new customers, previously out of reach

>> Telcos and Pay-TV operators now have a strategic opportunity: reach new subscribers that didn't meet the required broadband **eligibility** criteria (sparsely populated rural areas) or could not install a satellite dish (dense urban areas). To do so, they will have to define a full-OTT commercial offer that may or may not be similar to their broadband or satellite offer.

Generate new revenue streams from advertising

>> Operators have gathered valuable knowledge (through explicit users' **consent**) about their subscribers and their family members (sociographic/ demographic/geographical data, personal interests, content consumption habits, time of activity at home or on-the-go, etc.). They are often perceived as **trustworthy** by their customers, complying with national regulations and publicly displaying their conduct charter. This **first-party data** is often compared to digital oil by advertisers wanting to exploit this resource to display relevant advertising campaigns to the right audience, at the right time, using the suitable format for the device used. Advertisers pay a higher price for targeted video advertising campaigns, more than for other types of advertising. Operators have their own ad inventories to display various ad formats, especially their connected TV video ad inventory (**CTV inventory**), the fastest growing and most valuable segment. By securing ad revenue share deals with television channels, operators are in a unique position to operate a targeted advertising service by replacing TV ad breaks on linear television.

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Outsourcing the OTT video platform is best and with Globecast it is even better!

Why Globecast and its winning ecosystem?

Keywords:

Outsourcing, Complexity, Risk Management, Cost Optimization, Incremental Revenue, Users' Satisfaction

By outsourcing an OTT video service, operators can focus on their core business, while building customer loyalty and increasing client satisfaction.

Working with Globecast – an end-to-end OTT video service integrator of industry leading and preapproved partners – operators will obtain:

Sustainable Total Cost of Ownership (TCO)

>> Globecast helps operators finance their OTT video project, reducing CAPEX by providing a flexible, **cost-per-subscriber** business model to help them grow their business while keeping their costs related to subscriptions low. Furthermore, Telcos reduce OPEX thanks to efficient media encoding, minimizing the bandwidth required while preserving video quality. Another benefit is an increase in the number of homes eligible for HD or even UHD content, delivered on-net using the Telco's efficient CDN with extremely high cache hit rates.

Minimal operational risks

>> Globecast builds on cloud technology to benefit from **infrastructure elasticity** and minimize the risk of server failure, bringing cost-effective **operational resilience.**

Unlocked business agility

>> Globecast enables operators to **adapt to changing business conditions** thanks to its cloud-based platform. Launching and testing new services becomes easy, via faster time-to-market and with frequent deployment of new features.

Removal of both technology burden and increased complexity

>> Globecast helps operators transition from a wellknown, single TV device environment (the TV settop-box), to the more open and complex domain of TV Everywhere apps for multiple user devices by managing the app development lifecycle for the many device platforms (Google, Apple, Amazon, Samsung, LG, etc.) popular in viewers' homes.



It's complicated to launch an OTT video service

The modern requirements when launching an OTT TV/Video service

Keywords:

Architecture Design, Vendor Ecosystem, Integration, Managed Service, Methodology, Cloud Infrastructure Creates an attractive/expected packaged content offer for domestic, thematic and international line-ups: live TV channels, VOD, Netflix, Amazon Prime Video, YouTube, TikTok, etc.

Accelerates time-to-market to deliver on time, in either build or buy mode.

Avoids the problem of a shortage of skilled people and tight financial resources.

Overcomes the complexity of managing multiple components of a comprehensive OTT Video service.

>> Leading an ecosystem of pre-validated, best-inclass partners, **Globecast** ensures operators create a state-of-the-art comprehensive OTT video platform, while reducing risk, cost and delay, with a highly flexible business model and winning ecosystem.



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What you get with Globecast and its partners

Globecast and its rich ecosystem of partners

Globecast positions as software integrated service provider.

>> Understanding of business stakes

- Active listening.
- Consulting advice on offer definition and business models: Super Aggregator, Transactional VOD, Subscription VOD, Ad-supported VOD, Pay TV, Free Ad-supported linear Streaming Television (FAST), Pay-per-view Events, Pay-per-time Television, etc.

>> Solution design

- Get the right solution with the right partners, using future-proof technology. A solution that just works out of the box, from our expert engineers and pre-approved partners in our winning ecosystem.
- Financial agility to accompany our clients to onboard, launch, and grow their OTT Video service.

>> Complexity handling

The TV Everywhere approach means managing a constantly evolving multi-platform, multi-App Store environment and following the best UX (user experience) design users expect. Content preparation, secure delivery, and playback in this multi-device environment can be technically challenging. By working with Globecast and its winning ecosystem, operators take this burden off their shoulders.

>> Smooth project management

- PMI-certified Project Managers with a methodology proven by our long history, track record and market presence.
- Vastly reduced risks on project delivery, including coordination with various parties.

>> Training

 How to use the service platform: manage content, recommendations, commercial offers, users, payments, analytics, etc.

>> Service operations

- 24/7 operations and customer service.
- Skilled people and an efficient organization with ISO certification.

>> Platform lifecycle management

- The continuous evolution of the offer, business model, technology, etc.
- DevOps, training.

>> Superior experience for your subscribers

- Captivate your audience with a high quality of qexperience, including:
 - The highest quality images and sound (at the lowest bitrate),
 - Broadcast-level latency and reduced start-up time,
 - Compatibility with an extensive range of devices.
 - •Secure content playback with multi-DRM support, including secure "download-to-go".

>> Pay-as-you-grow solution

 A highly scalable platform so operators can start with a small investment and easily scale up as subscriber numbers grow.



Media-preparation:



Ateme provides a high-quality and highdensity video-processing solution that's designed for all content formats to:

- Offer a premium viewing experience by delivering the highest-quality content at the lowest bitrate to captivate your audience with all kinds of content (including 4K, UHD, and HDR), while also achieving broadcast-level latency and reduced re-buffering;
- Reduce total cost of ownership by saving bandwidth and storage requirements with unmatched compression efficiency, fasterthan-real-time capabilities, and simultaneous processing of all formats;
- Deploy anywhere with a solution that can run on-premises on an application or in a virtualized environment, off-premises in a private, public, or multi-cloud configuration, within a hybrid architecture;
- Protect your revenues by protecting your content with the relevant encryption and watermarking standards;
- **Go green** by saving bandwidth and storage requirements with unmatched compression efficiency and no compromise on video quality.

Back-end service delivery platform:



Viaccess-Orca provides a state-of-the art Service Delivery Platform with a modular approach:

- Customer management:
 - Users accounts, devices, preferences, adhering to privacy regulations, ticketing and customer care;
 - Personal profiles (e.g., kids' profile with parental ratings to ensure content safety) and personalization (e.g., personal continue watching – enables switching to another device and keep watching from the same point);
 - Customer segmentation, group operations and promotional messaging.

Content management:

- Advanced content catalogue for on-demand, linear TV and time shift services (e.g., TV startover, catch-up TV, etc.);
- Recommendations personalized to each viewer's interests, watch history, and preferences;
- Content meta-data such as TV program guides, film and series synopsis (e.g., actors, director, artwork, covers and more);
- Universal ID and holistic cross channel content management;
- Control and audit content usage and ensuring compliance of content rights by enforcing maximum devices per account, maximum active sessions);

Service management:

 Creating flexible offerings and packages in minutes, with various transactional and subscription based business models (like SVOD, TVOD, AVOD, eST, pay-per-time TV, pay-perview events, etc.), and payment methods (including carrier billing);

- Scalable and secured interface (API) with viewers' apps and devices (front-ends) with identification and consistent shared application context (business analytics and reports to follow business performance, service usage, and content viewing to understand content success and ratings);
- DRM license server to secure content playback on devices, restrict access to only legitimate users and enforce business rules;
- Technical monitoring reports to follow quality of service/experience and operational performance status.

Telco CDN:



Ateme offers an elastic CDN designed to:

- Offer a superior viewing experience by enabling broadcast-level latency and eliminating re-buffering thanks to smart caching and a 99% cache hit rate;
- Lower costs by building an elastic CDN that scales temporarily to ensure high-quality video even during peak viewing, without investing in over-capacity;
- Get new revenue streams with targeted advertising (Dynamic Ad Insertion) and personalized TV, and by monetizing the CDN to third-party Content Providers, expanding to new regions through CDN interconnect (Open Caching);
- Deploy OTT streaming media platform over 5G with a Multi-access Edge Computing (MEC) architecture to offer next-generation, highly personalized experiences integrating video with social media and more, with even lower latency and higher quality;
- Reduce environmental impact with highly efficient technologies and architectures that optimize network usage and reduce storage requirements, resulting in overall energy savings of 66% for a greener streaming media solution.

TV set-top-box:



As a key member of the Android TV ecosystem, ZTE has a full range of Android TV set-top-box (STB) solutions with strong advantages:

- Rich Experience Commercial Cases around the World: Top vendor with a number of activated Android TV STBs since 2021 of 1.5 million weekly active users and 3M+ monthly.
- Quality Control Improved User Satisfaction:
 - Ultra-reliable products with a 0.1% annual failure rate;
 - Quality Control at every stage: R&D, contract delivery and after-sales with corrective/ preventive actions;
 - Mature 7x24h local support achieving fast response for emergency.

Fast Time-to-market - Fast Deployment of Innovative Services:

- Strong cooperation with hardware component vendors to guarantee the supply;
- ZTE is a Hailstorm member, an Android TV scaling program designed by Netflix to reduce the Netflix integration effort for partners on the Android TV platform;
- Strong cooperation with top Content Providers such as Amazon Prime Video and Disney+.

Front-end TV application:

dot screen

DOTSCREEN is an experienced agency focusing on ease-of-use for a modern and distinctive user experience.

The operator's App can reflect its brand and values, while integrating with the back-end platform and data sources. The App implements – in a consistent way – best-in-class features such as "resume watching on another device" and innovations across any platform, from mobiles to Smart TVs. DOTSCREEN technological expertise helps handle the various platforms' specific requirements and quickly pass the QA (Quality assurance) process to land on the different App Stores with a shortened time-to-market.

Secure Media Player:



The Secure Media Player by Viaccess-Orca,

available on a wide range of device platforms, supports secure playback of adaptive bitrate HLS and DASH streaming formats with Multi-DRM encryption, client-side usage statistics and QoS/QoE metrics gathering, pre-roll video ads support. It also provides to users many UX features such as playback speed control, live time-shift navigation, cast-to-TV, download-to-go, audio and subtitle track selection.

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Business focus: Globecast, the Managed Service Professional

Globecast, the professional Managed Service Provider

Keywords:

Managed Service Provider, People, Training, Methodology, Certification (ISO, ITIL), Hybrid Cloud Operation, Agile, Best Practices, Ecosystem, Prime System Integration

oday's online video projects involve people that used to have **different technical cultures**. We now see a real **convergence** between domains such as telecom, broadcast and media, software, on-premise and cloud IT infrastructures, devices and UXs/UIs. These domains used to have their own **methodology** and followed specialized **best practices.** Even though the methodologies haven't yet fully converged, these people now have to work together on a common project.

Globecast invests both in people and technology to cope with an evolving TV and video technology landscape. We've seen earlier in this paper that we **attenuate complexity and risk** by prevalidating best-in-class vendors, building a **winning ecosystem of partners**. These complex and hybrid workflows – both in the cloud and on-premise environments – bring out the best of both worlds from technical and cost perspectives. But they require trained personnel to deploy and operate, with expertise in several domains such as software and cloud.

Globecast's goal is to become in 2022 one of the first **Managed Service Provider** (MSP) on the market, in the media domain, to obtain ISO 20000 certification, thanks to our conviction that Information Technologies (IT) best practices are absolutely relevant for the media industry. This certification relates to IT service management and is based on ITIL (Information Technology Infrastructure Library) methodology, as applied by our trained employees to improve efficiency, predictability and measurability. Globecast, who maintains a Quality Assurance Plan (QAP), already obtained certification related to security with ISO 27001; and related to environmental and energy management with ISO 14001 and 50001.

The obvious services of an MSP relate to technical support with ticketing and management of infrastructure and systems. But clients also benefit from professional project management; a survey of innovation and the industry's best practices; monitoring of normal operations or related to security events; configuration and change management with roll back; and comprehensive planning for continuity of operations.

Because nowadays vendors frequently adopt micro-service architecture to implement their product functions in virtualized containers running on commercial off-the-shelf (COTS) servers, the role of **Prime System Integrator** taken by Globecast, at the center of the winning **ecosystem of** **partners**, is crucial. Virtualized software functions in micro-service architecture are loosely coupled. This means it becomes easier to deploy a new version of a service or migrate to another vendor providing a better option. But the ultimate peacekeeper that guarantees smooth operation for the global platform is Globecast, acting as Prime System Integrator.

Such platform architecture is cloud native. But, when it comes to video workflows, technical and cost optimization often lead to **hybrid deployment** where part of the IT workloads are ideally placed in **cloud** infrastructure and some media processing workloads are best suited for **on-premise**. Globecast has built unrivalled expertise across such hybrid infrastructure, thanks to our long history with video head-ends platforms and more recently – but already highly evolved – skills with public cloud provider Amazon Web Service (AWS). It is our job to plan, design, test and modernize; but also operate, scale and optimize.



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Technology focus: Moving to OTT video future-proof technologies & infrastructures

FOCUS ON TECHNOLOGY

Keywords:

Android TV, Play Store, Set-top-box, Super Aggregator, TCO

ABR, mABR, HLS, DASH, CMAF, DRM, CDN, Latency, CMCD, VMAF, Deep Caching, Open Caching, MEC

DAI, CSAI, SSAI, Stream Stitching, Ad Inventory, CTV

Hybrid Delivery, DVB-I, Operator App, Multiscreen, AI, EPG/Start-over/Catch-up androidty

>> What do Android TV and ABR streaming media bring to operators?

The TV set-top-box is a strategic asset for Telcos, cable MSOs, and Pay TV operators: they provide their subscribers with access to a world of media and entertainment content under their brand's umbrella. By adopting Android TV, they keep their curated universe of content (their walled garden), but they choose to let users navigate the open world of content found on the Google Play Store. Most Telcos and Pay-TV operators who have chosen to do so, are satisfied with their decision, though it was not easy to let these third-party OTT services reach their TV set-top box. However, the situation is now very open by nature, because users are already using these OTT services on their mobile devices. Most TVs in living rooms are Smart TVs, and OTT video dongles are cheap and very successful (e.g., Fire TV, Roku, Chromecast, etc.). Openness keeps viewers happy with their primary TV access device. It unlocks new business opportunities for a Super Aggregator strategy, where the subscription and payment journey on third-party apps such as Netflix is controlled by the operator using carrier billing, enhancing trust and reducing friction (no credit card details to provide). By adopting Android TV, Telcos, cable MSOs and Pay-TV operators also reduce their total cost of ownership, relying on Google to provide R&D efforts for the underlying software platform maintenance and roadmap on the TV device side.

Furthermore, releasing and updating the operator's apps for the Android TV platform requires less specialized skills, thanks to tools that are well known in the Android developer community. Android TV set-top-boxes help reduce operational costs by transitioning to a smartcard-less CAS (Conditional Access System) and DRM (Digital right management) to entitle subscribers from an online platform without requiring dedicated physical components (CA module, subscriber's card), therefore saving costs on card handling and shipment.

ABR (adaptive bitrate) streaming media

technology brings another set of advantages to operators. ABR streaming media uses the universal HTTPS protocol and is delivered using ubiquitous components (HTTPS web servers) deployed and managed on either the telco CDN for on-net delivery or a public CDN for off-net. The most used ABR packaging formats are **HLS** (by Apple and IETF) and DASH (by MPEG and DASH Industry Forum). CMAF (by CMAF Industry Forum) is a newer format unifying media delivery while keeping lightweight playlist manifests files in both HLS and DASH formats, saving resources and costs across packaging, storage, and delivery. CMAF is not yet broadly supported by devices. These packaging formats now have an optional Low Latency mode (LL-HLS, LL-DASH) that's especially relevant for live sport events, providing broadcast-level latency or even better while preserving quality-of-service during content playback.

Media CDNs are **content delivery networks** that can cope with a large peak audience and deliver on-demand video content, live events and linear television channels. The network is one of the most valuable assets Telcos have; building an Onnet Telco CDN is an investment for the future that differentiates them from those using public CDN services, enabling them to get much closer to their viewers. **Deep CDN** edge cache servers can be deployed in telco networks near fiber access nodes, copper line DSLAM, and active mobile network towers supporting **NFV/SDN** (Network Function Virtualization/Software-Defined Networks) using **MEC** (Multi-Access Edge Computing) infrastructure. Edge servers can also go as deep as the home network and be located within a Telco's home gateway to serve the ABR connections from the many OTT personal devices in the home: mobiles, tablets, Smart TVs, etc. **Open Caching** by the Streaming Video Alliance is working in that direction, with the specification for a Home Storage Open Caching Node (HS-OCN) and Open Caching for MEC. When implemented by CDN vendors and analytics providers, **CMCD** (Common Media Client Data) by CTA-WAVE, a mechanism based on a media playback session identifier, enables video streaming performance analysis using both client (media player) and CDN **logs**, helping the operator to drive a better video streaming experience.

Dynamic Ad Insertion (DAI) for linear television ad break replacement per viewer becomes easier with ABR streaming. It replaces Transport Stream splicing technology in the set-top-box with manifest manipulation and **stream stitching** that can occur server-side (**SSAI**) or client-side (**CSAI**) and is Multiscreen by nature, unlocking a larger size inventory stock beyond the TV box.

Although **Pay-TV** operators don't have a telecom network, they can easily go over-the-top by using any Internet access their subscribers have in their homes. The TV set-top-box may still receive broadcast television services, especially from direct-to-home satellite broadcasting (DTH), thus enabling a rich world of possibilities thanks to the Internet connection. Another benefit comes from a possible channel lineup split between broadcast and broadband. Most premium channels will stick to satellite delivery, while less popular channels and pop-up channels may be delivered exclusively over broadband, saving on satellite capacity costs. **DVB-I** is the new standard addressing this broadband+broadcast delivery for a hybrid TV device.

Operators can also provide an **Operator App** for Smart TV platforms (Samsung, LG, Android TV, etc.) already available in viewers' homes. Virtualizing the set-top-box for specific market segments lets operators retain the physical TV set-top-box for most households.

mpeg-DASH





Moving away from legacy IPTV technology and embracing OTT Video ABR streaming media technology

By adopting OTT video technology based on ABR and CDNs, Telcos unlock access to the world of content found on the Internet and bring it to their TV set-top box. But then the question raised is whether or not to maintain legacy IPTV technologies such as DVB Transport Streams (TS) using UDP/IP multicast for live TV and RTSP/RTP for some old video-on-demand systems. By giving up on these legacy technologies and embracing futureproof and universal ABR streaming media, Telcos expects cost reduction and less maintenance with a single (instead of several) convergent media pipeline, while developing expertise across modern technologies. Specific Telco CDN technologies, such as **mABR** (Multicast ABR) and **Deep Caching**, can help transition from IPTV legacy technology to full ABR unicast content delivery. **mABR** keeps the multicast one-to-many attribute to cope with peak audiences until an operator finishes building an appropriately sized, reliable CDN infrastructure. Deep Caching helps the operator split the global load to local smaller loads handled by deep cache servers running on MEC (Multi-Access Edge Computing) infrastructure close to the users.

Also, OTT Video ABR **unlocks innovation** by **quickly enabling** new services such as VR (virtual reality and immersive video in 360 or 180 degrees),

advanced audio experience (e.g., choose your own mix), advanced video experience (e.g., select your camera and multi-live), the latest improvements in audio and video quality (e.g., spatial audio, high frame rate, high dynamic range, wide color gamut, lower latency), and "watch together" with social interactivity on the TV app or the companion mobile app. New monetization options appear, such as linear TV ad-break replacement with advertising targeted for each viewer or home. Video advertising is obtained programmatically (automatically) from video ad servers. It's also easier for Telcos to adopt newer and more bandwidth-efficient audio and video codecs already supported on only some devices, but not yet all of them, requiring device capabilities management. VMAF can be used to evaluate the quality of encoding settings or transmission variants, helping decide on applying optimization while preserving the VMAF score (i.e., the perceived video quality). Video Multimethod Assessment Fusion (VMAF) developed by Netflix and a couple of universities in the USA and France, who received an Emmy Award for recognition of the work, is an objective video quality metric.

Replay TV: Accurate and cost-effective?

Providing TV content on-demand, either as a **catch-up TV** service, a **TV start-over** service, or a network personal video recording service (**nPVR**), requires a delicate equilibrium. Balance must be found between the correct user experience, operational workflows, business agreements and channels' technical requirements. The most cost-effective solution is to use the TV electronic program guide (**EPG**) to get the program name, synopsis, poster image, start-time, and duration. The last two are the most critical data to use for the delinearization

of the TV program while aired on linear television channels. For stock content, such as TV series, it can often be obtained, but not always, from television channels as **video files**, dropped in advance in a hot folder with associated metadata. But nowadays, the promise of **AI-assisted content recognition** brings automated detection of the TV program name, start/end, and ad-break begin/end, improving timing when using a not-so-accurate EPG.



About Globecast

Globecast helps customers manage and deliver content to wherever, however and whenever required. The company provides agile and seamless content acquisition, management and distribution services globally, constantly innovating and investing in new technologies to create customer-centric new services. Globecast has created the number one global hybrid fiber and satellite network for video contribution and distribution. It delivers any type of video service including: end-to-end linear and SVOD/AVOD OTT, satellite, cable, using CDNs and cloud-enabled media solutions. It supplies Content Acquisition, Aggregation and Distribution services to over 250 networks.

About Viaccess-Orca

Viaccess-Orca is a leading global solutions provider of OTT and TV platforms, content protection, and advanced data solutions. The company offers an extensive range of innovative, end-to-end, modular solutions for content delivery, protection, discovery, and monetization. With over 20 years of industry leadership, Viaccess-Orca helps content providers and TV operators shape a smarter and safer TV and OTT experience. With its expertise in security, VO is also helping the digital manufacturing industry protect their assets. Viaccess-Orca is part of the Orange Group, and the company's solutions have been deployed in over 35 countries.

About Ateme

Ateme enables thousands of the world's leading content owners, broadcasters and service providers to captivate their audiences with a superior quality of experience through multi-codec encoding, any-format origin/packaging, scalable cloud DVR, audience-aware CDN and revenue-generating dynamic ad insertion solutions.

About DOTSCREEN

DOTSCREEN is a specialized multiscreen User Interface, and app design and development agency. With offices in Europe, USA & LATAM, the company delivers bespoke, or licenses customized, front-end solutions to Smart TVs, TV set-top boxes, game consoles, smartphones, tablets, and any connected device. The company expertise and solutions span any technology (iOS, Android, Android TV, HTML, HbbTV, Tizen, WebOS, RDK...). Clients are media and telecommunication companies such as Disney, HBO, Starz, TF1, Mediaset, Orange, Vodafone, Megacable, or OSN.

About ZTE

ZTE is a provider of advanced telecommunications systems, mobile devices and enterprise technology solutions to consumers, operators, companies and public sector customers. The company has been committed to providing customers with integrated end-to-end innovations to deliver excellence and value as the telecommunications and information technology sectors converge. Listed in the stock exchanges of Hong Kong and Shenzhen (H share stock code: 0763.HK / A share stock code: 000063.SZ), ZTE sells its products and services in more than 160 countries.



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