



Trends in Modern CDNs

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Content Delivery Networks



- Content Delivery Networks (CDNs) are overlay networks built to optimize content delivery QoS under varying backbone load conditions.
- CDNs traditionally assumed an “access centric” approach where the type of content was more or less irrelevant and simply distributed static content to edge servers (caches).
- The advent of streaming media and their dynamic nature forced the development of “content centric” CDNs where the type of content influences its location, server performance, BW requirements, protocols etc.
- Network convergence to all-IP infrastructures, new standards and technologies like IMS and new competition and business models like Triple Play lead to the development of a new type of CDN.

CDN stakeholders



- **Content Provider:**
 - Owns the content, expects revenue from its consumption
 - Examples: Movie studios, TV stations, News organizations, large portals.
- **Service Provider/Content Aggregator:**
 - Bundles various types of content in billable entities
 - Provides the building blocks for user experience
 - Examples: Portals, search engines, Video aggregators, TV networks
- **CDN Provider:**
 - Manages the delivery of content from ingestion to consumption
 - Provides the application specific infrastructure
 - Manages QoE (Quality of Experience)
- **Network Provider:**
 - Provides and manages the underlying networking infrastructure
 - Manages QoS
- **End User:** the consumer of the content services

In real life, roles can be mixed at any level for different entities.

Synergies and Conflicts



- Content providers want to protect their content from unauthorized access:
 - Conditional access and DRM add processing (CDN), communications (Network) and management (Service) overheads
- Service Providers want to:
 - mix and match products requiring a very flexible infrastructure (CDN),
 - employ different billing systems requiring customization (CDN),
 - Provide a particular set of user interface capabilities often dictating the STB type.
- Network providers want to:
 - control their purchasing of network components (e.g DSLAMs) sometimes without regarding the new service needs.

CDN Requirements



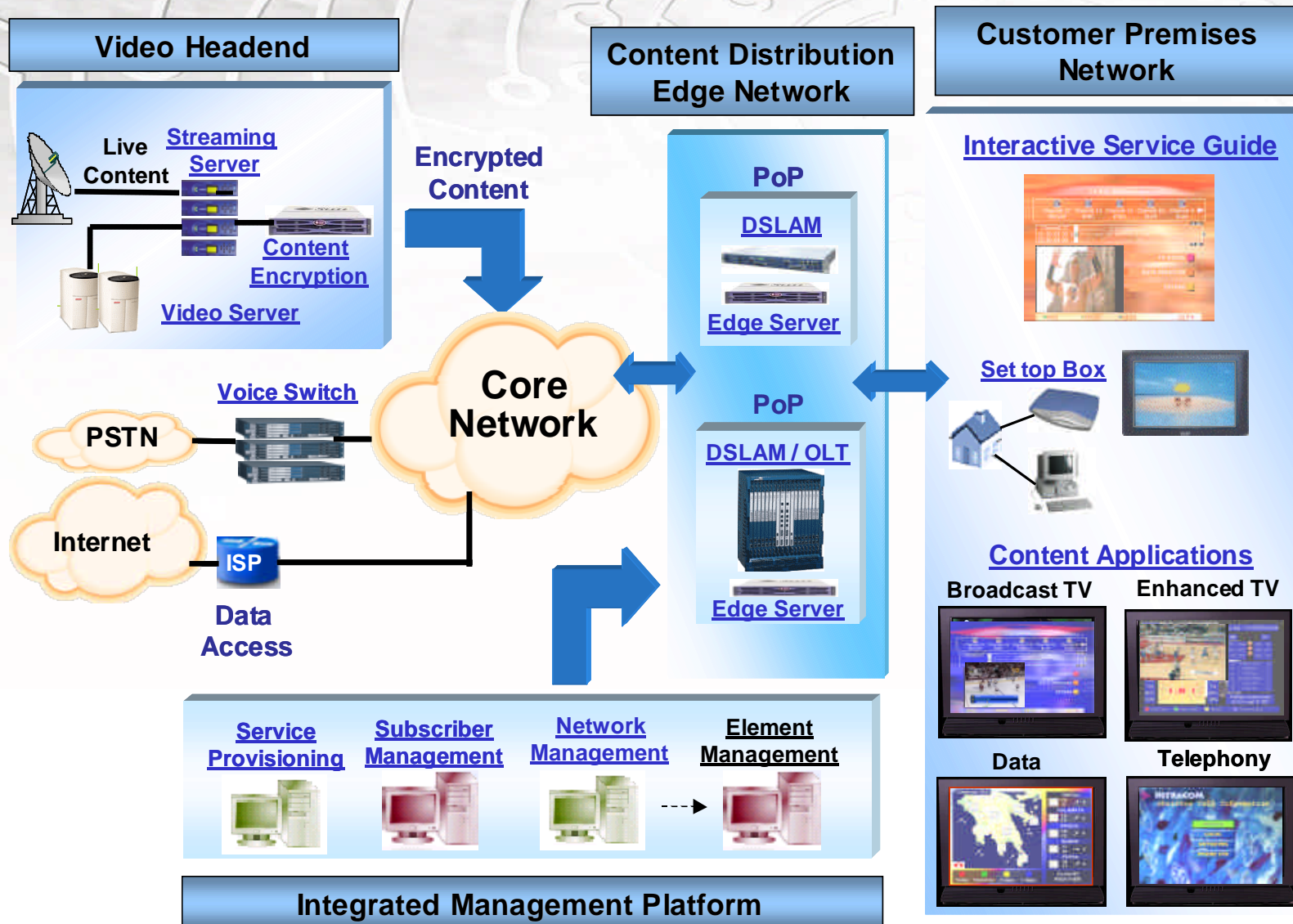
- The system should support:
 - Multiple content providers
 - Multiple service providers
 - Multiple network providers
- Each role should be isolated from the others if necessary but combinations should be possible
- System should be operated by as few people as possible
- System should support video (broadcast and VoD), data and telephony
- Content should be encrypted if required (e.g. TV, VoD) and access should be cryptographically controlled
- System should provide a customizable interface for BSS
- System should support many types of network infrastructure (Ethernet, ATM, DSL, Optical)
- User interface should be rich and easy to use.

CDN Service Requirements



- **Digital TV & Digital Music** - Live broadcasted channels
- **Pay-per-View (PPV) & Near Video-on-Demand (NVoD) events** –
- **Video-on-Demand (VoD) & Audio-on-Demand (AoD)**
- **Personal Video Recording (PVR)** – On Network and/or STB
- **Interactive TV Services** – e.g. Enhanced Sports, Weather Forecast
- **Multiplayer Games** – on TVs
- **High-Speed Internet Access** – On PCs and TV sets
- **Walled Garden Web Portal** – Data services on TV and PCs
- **Unified Messaging** – Emergency (EAS), Promotion
- **Targeted Advertisement, Commerce, Betting Applications** – On PCs and TVs
- **Integrated Telephony Services on all devices** including TV - Either Analogue or IP-telephony

CDN Architecture



Challenges



- Technical:
 - Integration: CDNs can become very complex, having components from many different vendors will almost surely lead to very high integration costs and long time-to-market.
 - Provisioning, Installation and Support: Companies should provide in-house networking. Provisioning, Installation and support costs become very significant.
- Business:
 - No longer a telecom provider. Consumer information, entertainment and connectivity services require new ways of thinking.
 - Services do not last forever. Constant change is required at all levels (content, bundling, user experience, infrastructure)
 - Localization and personalization the biggest competitive advantage over other non Telco competitors (Cable, Satellite, DTTV).

Additional requirements



- Integrated, end-to-end systems have a big advantage
- The system should have integrated solutions for home networking (addressing, service discovery, stream adaptation etc.)
- User interfaces should be easily customizable (declarative definitions instead of procedural)
- Service management (bundles, content distribution etc.) should be customizable
- Statistics and user profiling should be an integral part of the system.

A State of the Art System: FS | CDN



- FS|CDN is an end-to end system providing:
 - Content Provider Management System
 - Providers define content, metadata, presentation rules
 - Content is transferred and stored securely at the central system
 - Content is secured until it is presented. Every device has its own key, even in a home network
 - Service Provider Management System:
 - Service providers define content bundles, billing rules, profiling rules, timing rules, access rules
 - Subscriber Management System:
 - Provisioning, rights, billing, profiling, suspension, self-provisioning
 - CDN Management System:
 - Content distribution locations, transmission parameters, key generation, encryption, content presentation support are defined.
 - Emergency Alert System:
 - Notifications of emergencies depending on location delivered to clients where they appear instantly. Force tuning to a TV channel supported.

A State of the Art System: FS | CDN



- Network Management System:
 - All CDN devices are managed, from central system servers down to individual STBs. (QoS monitoring, configuration, fault management)
- Telephony and Unified Messaging:
 - Full SIP softswitch for voice and video conferencing
 - Voicemail, e-mail, chat, SMS. CallerID on screen, notifications, presence
- Home Network System:
 - Service discovery, automatic addressing, data sharing, home network streaming of local content, support for e-commerce
 - Rich user interfaces
 - EPG, Self provisioning, messaging
- The Local Information Package:
 - Localized information collected, formatted and presented
 - Weather,
 - Airport and traffic info
 - Classified Ads
 - Local news
 - Local events
 - Local sports

Conclusions



- Creating a CDN for the Triple Play era is a very complicated matter
 - Meet conflicting requirements from all players
- Buying a CDN for Triple Play is even more complicated
 - Important steps are:
 - Define business plan and service mix
 - Select Middleware vendor (including conditional access)
 - Degree of integration
 - Ease of use
 - Support for multiple business models
 - Security, redundancy, performance
 - Select STB
 - Graphics capabilities
 - Stability
 - Price
 - Select networking infrastructure
 - Flexible multicasting support
 - Management
 - Integrate and test
 - Deploy



End-to-end Triple-Play Service Delivery Platform

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Content Distribution Network

Thank you

For more info:

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<http://www.intracom.com/fs-cdn.html>



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