Content delivery networks:
Market dynamics and growth perspectives
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Introduction
Transforming CDN market brings new opportunities for all participants

For more than a decade, content delivery networks (CDNs) have played a crucial role in the effective operation of the Internet, helping to mitigate problems such as network congestion, packet loss, jitter and delay. Rising numbers of Internet users and increased bandwidth usage have both played a major part in transforming the market for CDN service provision. Just as the CDN landscape has given way to new types of provider – including a diverse range of “pure play” providers and a growing number of network operator CDNs – so too has the ongoing debate about the potential uses of CDNs shifted into new territories, including the delivery of over-the-top (OTT) content, mobile video and cloud services.

There are many ways of measuring the value of the CDN market, and these reflect the diverse range of industry participants:

- For telecoms service providers and content owners with their own CDN, a CDN’s value resides partly in its ability to improve retail service delivery and support their efforts to win and retain customers.
- For industry manufacturers and providers of managed CDN services, the value of the market is premised on the demand from telecoms operators, content owners and other businesses to have their own CDN.
- For providers of commercial CDN services, the value of the market depends on the continued need among content owners and online enterprises for a wide range of content management and delivery services. These extend beyond basic per GB “bit delivery” and include premium services such as application acceleration, online security and website optimization.
- Finally, for content owners, the value of CDNs lies in the extent to which they provide a reliable and high-quality online experience for the end users of their content.

Informa’s new CDN forecasts assess the growth potential and specific trends shaping one small, but crucial, part of the burgeoning market for global content delivery. Specifically, they measure the growth of global commercial CDN traffic and revenues through to 2017. By 2017, the market for commercial CDN services is expected to be worth US$4.63 billion, reflecting a threefold increase from 2012. Video will be the largest contributor to commercial CDN revenue growth, accounting for 81% of total revenue in 2017 (fig.1).

Although the US will remain the largest market for commercial CDN services, its share of global traffic and revenue will fall. At the same time, China and Western Europe will increase their share of the global “bit delivery” market (fig. 2).

The full range of opportunities and benefits which the growing market for content delivery services offer market participants are certainly more numerous that these figures suggest. The following collection of articles attempts to explore some of these opportunities and identify key themes shaping the evolving CDN industry.

Related Research
CDN traffic and revenues: Global summary and forecasts
CDN strategies: “Pure-play” providers face growing competition, specialization and consolidation
CDN strategies: Network-operator CDNs face increasing innovation, diversification and collaboration

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Fig. 1: Global, CDN revenues, 2010-2017

Fig. 2: Global, CDN revenues per region, 2010-2017
Pure-play CDNs must specialize to survive

Since CDNs first became commercially available in 1996, the market has been dramatically transformed by the parallel trends of consolidation and growing competition. On the one hand, consolidation has led to the disappearance of some of the earliest pure-play CDNs. At the same time, the market has seen the arrival of new participants sporting a wide range of business models, product portfolios and service strategies (see fig. 1).

In addition to the acquisition of smaller CDN businesses by companies such as Akamai, recent years have seen the proliferation of new “infrastructure lite” CDNs. These companies operate little of their own server and data-center infrastructure, allowing them to offer relatively low-cost CDN services.

Meanwhile, the market is playing host to a growing number of network operators with their own CDN product offerings and strategies. Responding to the new interest among telcos in having their own CDN, several pure-play providers have implemented strategies for working more closely with the operators; these range from developing reseller partnerships with operators to providing managed and licensed CDN products. The introduction of managed and licensed CDN offerings by the pure-play providers is a direct attempt to capture what they see as an important commercial opportunity. However, recent trends point to a strong tendency among network operators to “go-it-alone” in the CDN market. This phenomenon means that the majority of telcos are emerging as a potential source of competition for the pure-play providers.

Although demand for new and more complex forms of online content delivery continues to increase, growing competition and falling “bit” delivery costs has prompted pure-play CDNs to specialize in specific markets and service segments. One notable trend has been the growing emphasis among market leaders such as Akamai and Limelight Networks on more lucrative “premium” CDN services such as website and application acceleration, online security and cloud storage. Some CDNs are also offering professional and content-management services such as website design and optimization, content control and digital publishing. By doing so, these companies are aiming to position themselves higher up the content delivery value chain (see fig. 2).

Instead of simply being viewed as a by-product of an increasingly competitive market, specialization should be embraced by pure-play CDNs as a key survival strategy. For larger CDNs, specialization means developing their focus on premium and professional CDN services while leaving basic content delivery to the growing number of network CDNs. Professional CDN services include a range of offerings which build on the knowledge and skill sets that the pure-play CDNs have accumulated in their role as early market developers. For smaller CDNs, specialization means developing a focus on underserved (or overlooked) niche markets and vertical industries such as public sector organizations, online retailers and gaming distribution companies.

Related Research
CDN strategies: “Pure-play” providers face growing competition, specialization and consolidation
Case study: Akamai’s CDN strategy
Case study: EdgeCast Networks’ CDN strategy

Case study: Chris Drake
Chris Drake is a Senior Analyst at Informa Telecoms & Media covering converged operator strategy, content delivery networks, Internet peering, next generation access and rural broadband.
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Fig. 1: CDN market timeline

- International CDNs launched: Digital Island; Sandpiper Networks; Akamai; Speedera
- Regional CDNs launched: CDNetworks; ChinaCache; ChinaNetCenter


- Competition: EdgeCast; BitGravity; Highwinds; Amazon Cloud Front; Cotendo; Voxel; NetDNA
- Consolidation: Internap acquires VitalStream; Akamai acquires Nine Systems and Netli; Level 3 acquires SAVVIS; Panther Express merges with CDNetworks

- Competition: Microsoft Azure; CloudFlare; Google; Yottaa; telco CDNs
- Consolidation: Tata Communications acquires BitGravity; Internap acquires Voxel; KDDI acquires CDNetworks; Akamai acquires Cotendo

Fig. 2: CDN service provider value chain

- Core
  - Media delivery • HTTP object delivery • Large file delivery (software and game downloads)
  - Reporting and analytics

- Premium
  - Website and application acceleration • Front end optimization • Dynamic content optimization
  - Cloud storage • Scalable storage capacity • Fault tolerance and data replication

- Advanced
  - Mobile delivery • Multi-device support • Universal URL formatting • Mobile ad insertion
  - Professional services • Website design and optimization • Live event management • Training and customized services
  - Security • Web application firewall • Token authentication • Website cloaking

- Telco
  - Resale
  - Managed
  - Licensed
  - Federation

CDN service provider value chain

SOURCE: Informa Telecoms & Media
Operators must harness the power of CDNs to benefit core retail businesses

In the lengthy debates about what the growing number of telco CDNs means for the traditional CDN service providers, it’s easy to lose sight of fundamentals. For the majority of telecoms network operators the main purpose of having their own CDN should be to help them improve their capex and opex figures, while supporting their core business of winning and retaining customers. Although larger international carriers – or those with established wholesale businesses – have the potential to strengthen their competitive position vis-a-vis the pure play providers, the majority of telco CDNs operate on a different market scale from that of the pure plays. They also have different priorities.

By the end of September 2012, Informa Telecoms & Media had identified a total of 122 telecoms network operators worldwide with their own CDN (fig. 1). The majority of these operators have deployed CDNs to primarily support their retail business strategies.

Retail CDNs typically form part of an operator’s wider architecture for delivering video and other services to broadband and television subscribers. Content is usually pre-negotiated via commercial agreements between the network operator and a group of content providers, before being sold as part of a package of services for which customers pay a subscription fee. Many operators use retail CDNs that are intended to support the provision of managed content (IPTV and VoD) only. However, a growing number of network operators are deploying CDNs that support over-the-top (OTT) TV and other OTT content, allowing them to offer a much broader and richer range of services to broadband and TV customers.

The delivery of OTT content is just one of several ways in which operators are starting to use CDNs as part of their retail business. Other CDN-supported strategies include the extension of content to multiple devices and the delivery of content to customers outside an operator’s network footprint, license area or direct subscriber base (fig. 2). The ways in which operators use CDNs to support their retail businesses are not mutually exclusive; for example, many operators have deployed CDNs which allow them to offer both OTT content and multi-device access. Over time, it is likely that operators will use CDNs to support a range of objectives.

As telcos increasingly recognize the benefits of CDNs, a growing number will become progressively innovative with their use. One important innovation which is already drawing operator attention is the use of CDNs and other content delivery technologies within wireless networks to improve the experience of mobile users. However, in order to maximize the long-term potential offered by CDNs, operators need to ensure they get other things right, including the underlying commercial models with both subscribers and OTT firms, and of course the type of content they offer. When understood as part of an operator’s wider content delivery strategy, CDNs have potential to get really exciting.

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**Fig. 1: Global, operator CDNs, by region, 2005-2012**

**Fig. 2: Global, operator CDNs, by region**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
<th>Examples</th>
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<td>On-net managed – single market</td>
<td>Delivery managed content (IPTV, VoD) to subscribers within a single market</td>
<td>Kabel Deutschland, Germany; OTE, Greece; Simin, Iceland; TEO, Lithuania</td>
</tr>
<tr>
<td>On-net managed – multiple markets</td>
<td>Delivery managed content (IPTV, VoD) to subscribers: distributed across multiple markets</td>
<td>LIME, Caribbean</td>
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<tr>
<td>Multidevice delivery</td>
<td>“Classic” TV Everywhere strategy – customers access content they already pay for on multiple devices</td>
<td>Time Warner Cable, US; Comcast, US; NET, Brazil; Belgacom, Belgium; KPN, Netherlands</td>
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<tr>
<td>Mobile delivery</td>
<td>Customers can access content they already pay for on mobile devices</td>
<td>TELUS, Canada</td>
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<tr>
<td>Off-net selling</td>
<td>Sell pay-TV services to customers outside your network footprint, license area or direct subscriber base</td>
<td>Shaw, Canada; BilsyB, UK</td>
</tr>
<tr>
<td>Complementary OTT</td>
<td>CDN supports OTT service which complements traditional linear TV offering</td>
<td>Mediaset, Italy; Orange, France; MTS, Russia; Virgin Media, UK</td>
</tr>
<tr>
<td>Replacement OTT</td>
<td>CDN supports OTT service as a replacement for traditional linear TV offering</td>
<td>Telstra, Australia; Talk Talk, UK</td>
</tr>
<tr>
<td>Retail and wholesale</td>
<td>CDN is used for both wholesale and retail purposes</td>
<td>Telecom Argentina; Telefonica, Spain</td>
</tr>
</tbody>
</table>

**NOTE:** Figures are for end of period. 2012 refers to the first nine months of the year.

**SOURCE:** Informa Telecoms & Media

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**Related Research**

CDN strategies: Network-operator CDNs face increasing innovation, diversification and collaboration

Case study: Telefonica’s CDN strategy

Case study: The FT-Orange Group’s CDN strategy

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CDNs could help smaller OTT players disrupt the content hierarchy

The main issues confronting over-the-top (OTT) players are not necessarily funding content, but rather marketing it and getting it in front of people. Although CDNs play a crucial role in the process of delivering content to end-user eyeballs, the larger OTT players use a variety of CDN models. While companies such as Google, Youku, Tudou and, more recently, Netflix, use their own CDNs – either wholly or in conjunction with “pure play” providers – other major players such as Hulu, Facebook and Amazon continue to partner with one or more of the leading Internet CDNs – including Akamai, Limelight Networks and Level 3.

Network-operator CDNs argue they can offer OTT players something they can’t get from the pure-play CDNs: direct access to the end users of premium content supported by guaranteed end-to-end service levels. Despite this, research by Informa Telecoms & Media has shown that many content owners remain unconvinced about the need to pay a premium for online delivery (fig. 1). Indeed, given the resource differentials between OTT firms and the leading content houses, it remains the case that only the latter have the funds to woo telcos and cablecos with long-term contracts.

Many OTT players are therefore in a chicken-and-egg scenario. They need to have a higher number of users to be able to afford the most premium content, but they can’t afford the most premium content without more users.

Some OTT players have ambitious strategies for extending their international reach and positioning themselves favorably against big content houses such as Disney, HBO and Showtime (fig. 2). It won’t happen overnight, but over time Netflix could become something in the vein of an HBO-style channel online. It operates a similar model, consumers pay a similar amount of money for it in a year, and it has more control over its content. It’s easy to see a future where Netflix is simply another premium-content channel, competing on a pretty even keel with the likes of HBO, Showtime, Hulu and any other number of players.

The fate of other players rests much less in their own hands. It is patently clear that no other non-dedicated, free-to-air player will have the revenue to severely disrupt the content status quo as it stands today.

Although change in the content hierarchy depends, at least partly, on external factors – including the globalization of content and the extent to which greater consumer demand for “lower premium” content – telcos could have a role to play in this process. As telcos look for ways of building success for their embryonic CDN businesses, getting the right type of commercial models could help to produce some interesting “win-win” scenarios for telcos and OTT players alike.

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SOURCE: Informa Telecoms & Media

Related Research
Long term partners, or short-term fling? Operator and music service partnerships
Successful OTT services expanding abroad must outfox familiar foes
OTT original content: why Netflix, YouTube et al. must not create TV 2.0
Don’t make your interconnect solution into a problem for content owners

For all the “problems” with conventional CDNs that operators claim their CDNs can solve, they lack one fundamental feature: truly global reach. Although the concepts of CDN federation and interconnect aim to address this issue, they could cripple the operator CDN business case if poorly thought out.

Operators claim that control over their own networks will enable them to provide even greater quality of service than conventional CDNs by placing CDN equipment closer to consumers. The problem is that any operator CDN will be limited to the operator’s network. BT’s planned advanced offers, which will use equipment in its local telephone exchanges, will only serve about two out of five UK broadband subscribers.

For many content providers, this would be like trying to bang a square peg through a round hole. Content providers prefer Akamai, Limelight Networks and other conventional CDNs because they each can act as a single partner to improve the delivery of their services to Internet users if not worldwide, then for large parts of the globe.

To reach the same footprint via operator CDNs, content providers would have to work with several at an international level, and potentially at country levels too. This factor, combined with the absence of agreed technical or commercial CDN standards, would greatly burden the over-the-top (OTT) content business model.

CDN federation and interconnect promise to solve these problems by enabling multiple CDNs to exchange content and share content owner revenues. Various proposed models would provide content firms with the illusion of an international, regional or national service from a single provider (see fig. 1).

Among the challenges facing operators is the ability to agree on CDN interconnect standards. Failure to agree on common standards could “dumb down” operator CDNs to the point where they’re unable to compete with faster, more nimble pure-plays. While conventional CDNs stand divided; united operators could fall.

That said, there are ways that operators can make federation and interconnect work. They could, for example, seek to strike bilateral agreements with each other based on actual client needs, rather than trying to elaborate some grand global framework in abstraction.

Operators should also recognize that conventional CDNs are not necessarily their enemies. Partnering can provide access to a ready-made global footprint – and client base – as more and more operators are realizing (see fig. 2). Content providers are warming to the particular benefits of operator CDNs, although many continue to view conventional CDN providers as a natural point of contact within any CDN federation.

In some instances, operators should forget about federation and interconnect altogether. Content rights mean that the premium video services are often limited to national boundaries. Although more online video providers go global, Informa believes that bi-lateral agreements and partnerships are best suited to address this demand, if and when it emerges.

Ultimately, operators need to face the fact that their CDN plans risk adding unacceptable cost and complexity to a model that already works very well. As such, they need to step back from the conceptual preoccupations of CDN federation and interconnect, and concentrate on solving content providers’ real problems.

Fig. 1: CDN federation models

<table>
<thead>
<tr>
<th>Bilateral agreement model</th>
<th>CDN exchange model</th>
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<tbody>
<tr>
<td>Content provider</td>
<td>Operator CDN</td>
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<td>On-net consumer</td>
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<td>On-net consumer</td>
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Fig. 2: Telcos with a CDN resale agreement, or using a managed or licensed CDN product

<table>
<thead>
<tr>
<th>Traditional CDN</th>
<th>Operator</th>
<th>Market</th>
<th>Partnership Type</th>
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<tr>
<td>Akamai</td>
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<td>UAE</td>
<td>Resale</td>
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<td>NTT Communications</td>
<td>Japan</td>
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<td>Verizon</td>
<td>US</td>
<td>Resale</td>
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<td>Andorra</td>
<td>Resale/White label</td>
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<td></td>
<td>MegaFon</td>
<td>Russia</td>
<td>Resale/White label</td>
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<td>Ziggo</td>
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<td>Internexa</td>
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<td>XOCommunications</td>
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Related Research

CDN strategies: Network-operator CDNs face increasing innovation, diversification and collaboration

CDN strategies: “Pure-play” providers face growing competition, specialization and consolidation

Operators hatch global content-delivery strategy to fend off dumb-pipe future

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CDNs, the cloud and Carrier Ethernet
The new golden triangle

There’s a new golden triangle on the horizon. It promises sustainable revenue growth and service differentiation for communication service providers worldwide. Key elements of the golden triangle are CDNs, cloud computing and Carrier Ethernet (see fig. 1) – all established service categories in their own right.

But there’s a big ask: To profit, communications service providers (CSPs) must no longer view these services in isolation. A united strategy is required in infrastructure investment, service management and go-to-market. And this will require a mighty effort within many CSPs to erase internal silos and stereotypes.

Historically, CDNs have been a niche service, focused on live streaming and video delivery, often targeting a professional, broadcast media customer. Cloud computing, meanwhile, has been an IT-centric proposition, delivering on-demand scalability of compute cycles and storage within the datacenter. Not least, Carrier Ethernet has excelled in delivering a cost-efficient, flexible transformation path for legacy TDM infrastructure benefitting retail and wholesale clients – enterprises and mobile operators in particular.

Individually, these propositions remain relevant, but in a post-PC world, they are converging. Although largely invisible to end users, Informa argues that each of these technologies contributes to the number one goal for CSPs today: Reshaping the customer experience in a post-PC world.

According to Informa’s Industry Outlook survey, 69% of CSPs rank customer experience first among planned operational investments. But the role of CDNs, cloud computing and Carrier Ethernet is poorly recognized in this context.

Nevertheless, for connected consumers, content and applications must now be seamlessly accessible via diverse range of mobile devices – and often on the move. This can only happen effectively via cloud-delivered CDNs leveraging packet-optical infrastructure.

While the end user is the ultimate beneficiary of the golden triangle, multiple strategies are possible for CSPs. Targeting consumers, Indonesia’s Telkomsel is taking a direct approach by using Ericsson and Akamai’s Mobile Cloud Accelerator platform to speed webpage load time by up to 70% on mobile devices. In the enterprise segment, CSPs such as AT&T can upsell their CDN proposition with their cloud-based storage combined with premium secure connectivity. This approach is also relevant in wholesale, where CSPs like Tata Communications have discrete CDN, cloud and network assets to bundle. Valuable add-ons include managed application performance and security services.

Our recommendations:
• Build bundles, not bureaucracy: Functionally, CDNs, Carrier Ethernet and cloud computing services may exist in different divisions. Job one is taking a bundled proposition to market, then considering ultimate ownership implications.
• Expect competitors to evolve: Among competitors, cloud giant Amazon Web Services already targets enterprises and developers with a cloud-powered CDN, supported with the option of direct Carrier Ethernet connections.
• Value service aggregation: Each element of the golden triangle is already crowded and acutely competitive; price wars are a tangible reality. Ultimately, if CSPs don’t aggregate services to build value, a race to the bottom is almost certain.

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Related Research
2012 Industry Survey and Outlook
Sell the cloud to protect the core
Case study: Tata Communications’ CDN strategy

Fig. 1: The new golden triangle

Fig. 2: CSP growth perspectives

What are the biggest growth opportunities for Carrier Ethernet services?

Cloud computing
Wholesale mobile backhaul
Video distribution
Smart grids
Low-latency financial trading
Other

Respondents (%)

0 10 20 30 40 50 60

Inter-related

NOTE: Top two answers only

SOURCE: Informa Carrier Ethernet Futures Survey
Target new audiences with mobile CDNs

Contrary to video delivery in fixed networks (DSL, cable and FTTx), video in mobile can be a far more destructive service due to the nature of the mobile network. The radio channel is a shared and constrained medium and the contention ratio can be far higher than fixed networks. Moreover, radio spectrum is a very expensive asset for mobile operators and they will wish to exercise yield management to maximize profits from this limited asset. Mobile video presents a high volume, low profit service that comes with the potential to disrupt the user experience for all users in the same cell, making this service a top priority for mobile operators.

The market dynamics of mobile CDN and video optimization are now becoming clearer, since operators are pushed to handle video traffic in their networks despite the fundamental differences compared with fixed networks where CDN is widely used and a de facto standard for video traffic management.

CDN providers that partner with mobile operators are perhaps in the best position in terms of user reach and monetization opportunities. However, CDN equipment needs to cooperate with mobile network infrastructure in order to offer a consistent user experience and perhaps SLAs to content providers. The Akamai and Ericsson partnership is the biggest example of such a partnership, although mobile operators that have deployed Ericsson equipment may still be reluctant to allow more room for Akamai to monetize content delivery over their networks. Optimization vendors typically provide infrastructure to mobile operators to optimize traffic while other CDN providers (e.g., Google) usually operate independently of mobile operators to offer value added content delivery (e.g., ads or premium content).

Opportunities and challenges in mobile CDN are different for companies in different parts of the value chain. CDN providers can grow their addressable market significantly in mobile and perhaps attract attention in mobile premium audiences. By doing so, CDN providers may also forge partnerships with mobile operators so that they are able to have visibility deeper into the mobile network and eventually monetize this. On the other hand, third-party CDN providers do not have visibility into the radio channel and mobile operators are reluctant to allow them without some form of revenue share. However, both CDN and content providers are reluctant to share revenues with mobile operators, especially for video services. Opportunities and challenges in mobile CDN are different for companies in different parts of the value chain (see fig. 1).

Related Research

The impact of video and CDN in mobile
CDN strategies: Network-operator CDNs face increasing innovation, diversification and collaboration
Case study: Akamai’s CDN strategy

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Operators must partner to tame APAC’s tiger markets

After originally largely deploying their CDNs to support their own IPTV and online content offerings APAC telcos are now waking up to the wider opportunities presented by the CDN market. According to one measure of the value – the market for standard content delivery – the five years to 2017 will see a fourfold rise in commercial CDN revenues and a sevenfold increase in underlying regional traffic (see fig. 1).

The CDN ambitions of APAC telecoms operators are already causing a huge stir in the industry. Operators such as Korea Telecom had previously worked with specialist CDN providers – with KT being a long standing client of local CDN provider CDNetworks – but are now rivalling them in the market with their own CDN products and attempting to win customers.

Ironically, it was the CDN ambitions of another regional telco giant – Japan’s KDDI – which led to it purchasing a 85.5% stake in CDNetworks for US$167 million– thereby giving a huge boost to the firm’s long-term prospects in the international market.

With telcos looking to rule the roost in their backyards, other specialist CDN providers are having to look to foreign markets to ease the pressure – with China inevitably being the focus of huge interest from CDN operators.

The fragmented nature of the Chinese telecom market, with telcos offering services via numerous provincial subsidiaries, makes the local CDN market a complex one on the telco side, leaving the market clear for local CDN specialists like ChinaCache.

ChinaCache remains the stand-out player in the local market with a 50% market share, local rival China NetCenter takes a further 30% of the market. ChinaCache steadily added subscribers in the 2007-2011 period (see fig. 2), and is a formidable opponent for new foreign competitors.

The other huge area of interest in the APAC LTE market is around the launch of mobile CDNs with some operators such as Indonesia’s Telkomsel already launching mobile CDNs whilst others such as KT, SK Telecom, KDDI and Telstra are trialing mobile CDNs.

With APAC telcos leading the way in LTE deployment, they see the deployment of mobile CDNs as being a crucial way in which they can reduce international transport costs and manage local network traffic far more effectively – and provide a better video experience for users which could even turn into a new revenue stream.

Informa believes that there are huge possibilities ahead for APAC telcos in the CDN market – but they should not think they can take on all-comers by themselves. It will make good sense for telcos – wherever possible – to join forces with established specialist CDN players.

The fact remains that CDN specialists have the contacts, client relationships and market expertise that telcos crave and it might make good sense for telcos to explore how they can partner with CDN specialists wherever possible rather than engage in constant all-out war in the market.

Related Research
Case study: ChinaCache’s CDN strategy
Case study: Telstra’s CDN strategy
Battle for South Korea: Telecoms operators and specialists fight for CDN market share

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