

The Next-Generation Central Office



Service providers worldwide are migrating toward a single network for all services, paired with a new breed of CO.

By Michael Howard

Service providers worldwide face big network changes and big challenges. With their massive data centers, Internet content providers such as Google, MSN and Amazon have permanently changed the basic patterns of Internet traffic.

For example, video traffic growth alone is enough of a challenge. Now add the challenge of unpredictable traffic flows because users access video not just from fixed networks, but from mobile devices anywhere. If operators continue down today's path of just buying more capacity without adding intelligence and making architectural changes, their business models are doomed to unprofitability, their networks will underperform and their customers will churn to rivals with smarter networks.

That's why many service providers are optimizing their networks in 2 major ways:

- Moving toward a single network to support all services: fixed and mobile, private and Internet.
- Developing next-generation central offices, which Infonetics Research calls NG-COs.

Our discussions and surveys with service providers worldwide show that they're considering several architectural options to handle fixed and mobile access, particularly for video. The NG-CO is a location where traffic from both fixed and mobile can be in edge routers. It's a natural point of fixed-mobile convergence. But what's an NG-CO?

Currently, most metro networks have 10s to 100s of COs. Outbound traffic is funneled to a single, large Internet POP—the "super-POP"—that connects to the service provider's

BRAS: Broadband Remote Access Server
CapEx: Capital Expenses
CDN: Content Delivery Network
FTTN: Fiber to the Node
laaS: Infrastructure as a Service
IP: Internet Protocol

OLT: Optical Line Terminal
PaaS: Platform as a Service
PON: Passive Optical Network
POP: Point of Presence
SaaS: Software as a Service
WDM: Wave Division Multiplexing

inter-city, inter-country network and the Internet. Many functions, such as BRAS, are located in the super-POP.

Operators such as BT have identified a few large COs in a metro—clustered around the super-POP—that will house distributed BRAS and other next-gen network functions, creating NG-COs. In a large metro, there might be 5 to 10 NG-COs that aggregate traffic from the smaller COs and FTTN nodes.

Many operators plan to deploy a variety of infrastructure and services in NG-COs:

- Caching/CDNs to significantly reduce metro, regional and backbone traffic, especially video.
- Adaptive video streaming to ensure an optimal viewing experience on any screen with whatever bandwidth is available.
- Mini data centers to offer cloud services such as IaaS and locate latency-sensitive applications.
- Distributed BRAS and mobile user management at the best point to capture user behavior data to enable intelligent ad.
- Converging fixed and mobile access onto a single aggregation backbone.
- In the future, OLT aggregation points for next-gen access networks such as WDM-PON.

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Cloud-Aware Capabilities

With these functions, NG-COs become part of a distributed, intelligent cloud resource. In their search for new revenue, many service providers—such as Interoute, COLT and GTS in Europe—are expanding their data centers to offer cloud services.

Many operators are considering creating mini data centers in NG-COs to offer PaaS, SaaS and IaaS. This architecture introduces more intelligence into the network in a distributed fashion because content and applications are replicated from originating data centers out to NG-COs. The computing resources can be used for running applications such as rich media and rendering, or latency-sensitive applications such as gaming.

Operators increasingly believe it makes sense to have "cloud-aware" capabilities—that is, mini data centers—in their networks. In this way, carriers believe that NG-COs can become part of a distributed, intelligent cloud resource.

These trends are well under way. One example is Deutsche Telekom's project to reduce the number of COs in Germany from 8,000 to 900. Another example is how most operators are moving toward fewer or a single IP/Ethernet/WDM network. The bottom line: Most operators are planning NG-COs. ■

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