100G+ and ROADM Strategies
Global Service Provider Survey

Report Excerpts

September 2014
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TOP TAKEAWAYS

The battleground for vendors of 100G-and-beyond coherent equipment and components for the next 2 years will shift to the metro as the long reach core application market saturates. We oriented the questions in this survey to attempt to reduce the uncertainty of this transition and add a quantitative perspective to the market ing that vendors are creating in anticipation for this opportunity.

- There are 2 very distinct customers for coherent technology. One is deploying long haul coherent today and expects to transition to metro coherent in the coming years. But there is another, separate customer type that is already fully committed to deploying coherent technology on shorter reaches.
- These 2 markets have major implications for the supply chain with regards to specialized products for the metro including a relative lack of interest in flex coherent technology by some customers.
- Data center interconnect is perceived as the major use case for metro 100G in the next 12 months.
- 100GE router interfaces are finally poised for growth as service providers see a need for 100G transport in the metro to/from these interfaces.
- Respondents expect 100G WDM to account for almost 40% of all metro wavelength deployments and 3/4 of the core network in 2017.

INTRODUCTION

Bringing Service Provider Opinion to the Metro Coherent 100G Debate

Deployment of 100G WDM ports tripled in 2013 and continues to grow rapidly through 2014. But by 2016 deployment of this technology in core networks saturates— and then the opportunity for coherent WDM technology at rates for 100G and beyond really lies in the shorter spans of the metro. We discovered that the killer app for metro 100G in the next 12 months is data center interconnect (DCI).

Methodology and Demographics Overview

We interviewed 31 service providers that have an optical transport network using WDM. Respondents must have detailed knowledge of their companies’ optical transport and switching equipment using coherent technology and ROADM-based WDM systems and have influence in planning and making purchase decisions for 100G and coherent optical transport and switching equipment.

These respondents are from service providers that collectively account for 33% of global service provider revenue and 36% of global capex in 2013 and represent all regions of the globe.
We asked service providers what percentage of new coherent wavelengths deployed in their networks during 2014 and 2017 will be in core (>600km) and metro-regional (<600km) applications.

Exhibit 1

New Coherent 100G Wavelength Installs in the Metro and Core

n=31, 31
Looking at averages misses an important detail as the results could be skewed by service providers deploying mostly in the metro today while other service providers focus on the core.

We've plotted the data in an alternate way with each respondent represented by one diamond; the 2014 metro coherent percentage is on the X axis, the 2017 percentage on the Y axis. Note several of the diamonds below represent multiple respondents who gave the same response.

A very interesting picture emerges when we look at the 2014 data: respondents fall into 2 groups: early core adopters that deploy 70%-100% of their coherent wavelengths in the core (which means 0% to 30% in the metro, as responses for each year total 100%), and early metro-regional adopters that deploy 70%–100% in the metro-regional (meaning 0%–30% in the core).

Exhibit 2 2 Groups Deploying Coherent 100G Wavelengths: Early Metro and Early Core n=31, 31
The data clearly shows there are 2 kinds of service providers using 100G today: those following the expected model where 100G is mostly used for long spans and sparingly for the metro (early core adopters), and another kind of carrier that is using coherent technology almost exclusively for links under 600km (early metro adopters).

**Early core adopters**: Respondents with less than 30% of coherent links deployed in the metro today; on average, this group deployed only 8% of coherent links in metro-regional applications during 2014. But by 2017, this average rises to 32%. By 2017, metro-regional goes from playing a minor role in their networks to being around a third of deployments.

**Early metro adopters**: Anticipate a lower percentage of metro coherent deployments in 2017, but I don’t believe this means they plan to use fewer metro links. It is likely that within this group, the magnitude of the metro and the core deployments increases, but the ratio shifts toward longer spans.

The key takeaway is that there are definitely 2 discrete markets for coherent technology: traditional carriers moving from core to metro deployments and carriers nearly exclusively focused on networks with reaches less than 600km.

One major implication for the supply chain: Equipment providers need to adapt products to address each market independently or decide that they will pursue only one of these markets. It is unlikely that a single product is capable of effectively addressing the whole market.
DATA CENTER INTERCONNECT IS THE KILLER APP FOR 100G METRO WDM

We asked service providers to agree/disagree with a number of statements reflecting their opinions on 100G in metro applications in the next 12 months, selecting a number from 1 to 7 where 1 is do not agree, 4 is somewhat agree, and 7 is strongly agree.

**Exhibit 3 100G Metro Applications in Next 12 Months**

<table>
<thead>
<tr>
<th>100G in Metro Applications</th>
<th>Average Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data centers and internet content providers are the major customers for metro 100G</td>
<td>5.5</td>
</tr>
<tr>
<td>We need to transport 100GE interfaces from our own switches/routers</td>
<td>5.2</td>
</tr>
<tr>
<td>We are waiting until 100G metro pricing drops further before we begin large scale deployments</td>
<td>5.1</td>
</tr>
<tr>
<td>100G will be used mostly to carry 10G and address fiber exhaust issues</td>
<td>4.9</td>
</tr>
<tr>
<td>100G metro links are mostly for direct connection to the core network</td>
<td>4.6</td>
</tr>
<tr>
<td>There will be rapid growth in 100G service requests from customers</td>
<td>4.1</td>
</tr>
<tr>
<td>Cost of metro 100G is competitive with 10G</td>
<td>3.8</td>
</tr>
<tr>
<td>The right products and technology are not yet available</td>
<td>3.6</td>
</tr>
<tr>
<td>Flexible coherent modulation is important enough for the metro that we will pay a premium</td>
<td>3.5</td>
</tr>
</tbody>
</table>

The consensus among respondents is that DCs and internet content providers (ICPs) will be the major customers for metro 100G in the next 12 months. Below this was that service providers are waiting for pricing to drop before large-scale deployments can take place. These 2 responses taken together would indicate that ICPs will be the largest source of metro 100G demand in the next year while other traditional service providers wait until 2016 for the price drops we feel will come.

Next in roughly equal importance are “transporting 100GE router interfaces” and “carry 10G and address fiber exhaust issues.” In the past, much more emphasis was placed on 100G as a mechanism for carrying 10G traffic. These responses should be interpreted as an indication that 100GE router interfaces are likely finally poised for growth as service providers see a need for 100G transport in the metro to/from them.
An annual question of this survey is the mix of planned wavelength speeds among service providers. We asked respondents to estimate the percentage of the metro or core WDM long-reach ports (not clients) of each speed they will install during 2014 and during 2017.

![Exhibit 4](chart.png)

Metro deployments are predominantly lower speeds with 90% of all wavelengths deployed 10G or less. By 2017, there is a dramatic shift in the metro with speeds of 10G or less dropping to just over 1/2 of all deployments. 100G coherent represents almost all of the increase and 100G non-coherent makes a larger appearance than years past. 200G speeds still represent a small portion of expected deployments.
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ABOUT INFONETICS RESEARCH

Infonetics Research is an international market research and consulting analyst firm serving the communications industry since 1990. A leader in defining and tracking emerging and established technologies in all world regions, Infonetics helps clients plan, strategize, and compete more effectively.

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