When networks provide transit, they typically charge based on traffic volume for this service. This can make traffic exchange expensive, especially since global Internet traffic continues to increase at a compounded annual rate of 30%.*
Building a Network of Networks: Internet eXchange Points

Interconnections between networks take place at Internet eXchange Points (IXPs), extremely large facilities heavily provisioned with rack space, bandwidth, and power where the world’s networks physically meet to connect to one another for mutual benefits. IXPs are the high-tech “farmers’ markets” that create the vibrant, commerce-based ecosystem of network connections – transit and peering, paid and settlement-free – comprising the Internet as we know it.

In California, the largest IXPs are in Los Angeles and the San Francisco Bay Area. All major international carriers connect to each other and other networks at these facilities. The more large networks use a given IXP, the more other networks, including middle and last-mile providers, will want to use that IXP.

New Regional Internet eXchange Points: How & Why

While existing IXPs were crucial to the formation of the global Internet and remain essential, rural and remote areas are disadvantaged since even local traffic must travel back and forth to existing IXPs, and the resulting latency – the traffic’s travel time over the network – impacts performance.

Establishing new regional IXPs can help alleviate these issues but can be challenging since a threshold number of carriers must participate before it becomes cost-effective. One way to attract carriers to a new regional IXP is for a middle-mile network operator to negotiate with large content providers to place content servers that enable the caching of high-demand content within the IXP.

Three Major Benefits of Regional IXPs for Rural Communities

**KEEPING LOCAL TRAFFIC LOCAL**

With a regional IXP nearby, rural users would experience lower latency to and from local resources like school districts, local government, commerce, news, and public safety – as well as for latency-sensitive applications like distance learning, telework, and telehealth.

Regional IXPs can also improve performance for rural users if large content providers agree to place content servers at the new IXP location. In addition to attracting other providers, this would enhance the performance of rural broadband by bringing content closer to customers and by providing local access to a range of cloud services.

**DISTRIBUTED FACILITIES**

New IXPs can also be distributed, freeing remote last-mile providers from connecting at a single distant facility. One example of such a distributed exchange is Pacific Wave, a project of CENIC and the Pacific Northwest Gigapop. Pacific Wave is a distributed peering facility that enables networks in East Asia, Southeast Asia, Oceania, and North America to interconnect. There are nodes for Pacific Wave interconnections in Los Angeles, Sunnyvale, Seattle, Chicago, Denver, Honolulu, Guam, and Tokyo.

**LOWER LATENCY, BETTER PERFORMANCE**

Without an IXP nearby, traffic from even a local source might have to complete a round trip to a distant IXP hundreds of miles away to arrive at a home just down the street, and users will experience slower performance when accessing popular content and cloud providers.

By improving performance, regional IXPs could also make the middle-mile network more useful for Internet of Things (IoT) uses such as environmental sensors, transportation and logistics, and disaster warning and response.

For more information, please visit [www.cenic.org](http://www.cenic.org)