

Shattering the Limits of Connectedness—Accelerate Time to Value

Technology innovations have advanced the concept of the “Shrinking World”. From inventing the wheel, to building roads and bridges, to sea-worthy ships, trains, automobiles, and airplanes, to the Internet and beyond. The world feels smaller with technology enabling ever increasing “connectedness”. Today, organizations are seeking more effective ways to leverage this new connectedness to access and monetize data being created by more than 29 billion IoT devices expected to deploy on enterprise networks by 2023. These devices, as core data center applications before them, are constantly creating videos, images, logs, and other formats; these may be used to affect healthcare outcomes, physical security, improve the efficiency of energy production and consumption, automate vehicles, and deliver greater value to customers, partners, investors, and colleagues. Creation of value requires data to be accessed, processed, and analyzed in real-time in support of never before available services.

Challenges

There are few places in this world without an Internet, telephone, wireless, or satellite connection. With the appropriate device, bits and bytes may be transferred across thousands of miles. Though these connections may support conversations or small file transfers, they are often inadequate for large data transfers, data access via high latency networks, or remote data analytics/processing. The main reasons are:

- The further the distance, the greater the latency. The science of physics precludes any effort to address latency itself. As latency rates increase, throughput rates get compromised. As a result, on a gigabit network link with 68 millisecond latency, only 6 Mbps of throughput can be expected.

Imagine there is a fire, and you need to use the water hose to put it out. When you turn on the hose, only a trickle of water comes out. It is not enough to put out the fire and the house burns down.



- The reason for the trickling of data through the available network pipe is the quality and congestion levels of the connection. A private connection will be of higher quality with less traffic and greater controls, but it may also be more expensive, especially over longer distances. A public network may have traffic congestions, inefficient routing, and “accidents” resulting in dropped packets. Since the TCP protocol was designed to be lossless, when packets are dropped, all packets in flight are dropped and resent to ensure zero loss. The result is that trickle effect of data coming through the pipe.
- Many applications can handle initial latency, time to first byte, but will time-out if latency is experienced intermittently due to poor throughput rates. Latency on a standard TCP connection cause lower throughput rates and lower throughput rates make applications wait and waiting causes applications to time-out; it is a vicious cycle.
- Inability to process data over distance forces organizations to move data to where compute is. This has created a whole industry of tools that are designed solely to move data as fast as possible. The consequences of moving or copying data are:
 - Delays in getting results from analytics/applications
 - Loss of productivity as employees may sit idle waiting for data to become available
 - Necessitating additional storage capacity, replication/migration software, and security management to move data closer to compute. These are all additional costs and business liabilities.
 - Some data may not be moved; there are restriction in many countries what type of data may not leave the country’s borders. The implication is that compute resources have to be deployed where data lives. An added expense.
- Some of the newest application around AI/ML, analytics, and software development are readily available in the cloud. To take advantage of these tools, data must be moved into the cloud, which is free, but once processing/development is complete, it is either trapped in the cloud or has to be brought back and incur egress costs. Going to the cloud to gain flexibility suddenly begets lock-in and unexpected rigidity.

A New Approach

It is always about the problem statement; if the problem is “I can’t move data fast enough” then the solution is a tool to move it faster. If the problem is “my storage consumes too much data center space” then the solution might be deduplication. For the longest time, the problem being addressed has been only a symptom. The real problem organizations are trying to tackle is:

How to overcome the barriers to real-time data access and align infrastructure with business value creation?

The answer must be:

Eliminate the dependence on data movement to achieve necessary insights and accelerate decisions.

The necessity to move data to where it can be processed creates the lag time that separates real-time results from delayed or even late-to-the-game results. Of course, as has been stated above, the challenge of processing data without having to move it is due to the inefficiencies of TCP/IP network over long distance. The new approach must focus on how to overcome the limitations of current network protocols without considerable disruption to the infrastructure.

Vcinity Solution

Vcinity shatters the limits of “connectedness”. Vcinity Data Access Platform™ (VDAP) enables applications to consume data from anywhere without falling victim to network inefficiencies. Applications and data are no longer bound by distance and latency. Vcinity ensures that insights are gained and value is created in business-time.

Vcinity’s VDAP leverages its 32 patents and standard RDMA (ROCE) to deliver performance, consistency, and quality of data access without reconfiguring your applications. VDAP can be deployed in a virtual machine, on a commodity PCIe card, or an appliance and delivers throughput performance at 95% of available bandwidth. Though latency cannot be affected, VDAP limits applications’ exposure to it only at the first byte; afterwards, the application thinks that data is located on the same LAN.

- A file system hands off a RDMA block to VDAP, which transfers it to the other location where another V-y instance relays it to the client using RDMA.
- VDAP ensures that data keeps flowing continuously so applications experience no intermittent latencies.

Remember when the fire hose was dripping water? The house would burn in the time it would take to get enough water to put it out. VDAP ensures that the water flows under full pressure, delivering it to the fire in time to save the building.



- The solution adjusts to available bandwidth to maximize efficiency and return on investment.

Summary

Proliferation of data everywhere has created new challenges for organizations; how to effectively monetize data, gain insights, and create value without falling victim to network inefficiencies and resulting delays. No longer is it adequate to deploy increasing “faster” data movers or larger edge caching devices; these only add cost but do little to accelerate time to value creation. Vcinity’s approach defines the problem as lacking data proximity. It resolves the problem by leveraging its Vcinity Data Access Platform to enable applications and data to connect despite distance and latency and operate as though they were local to each other. This new level of connectedness is achieved without disruption to application, workflows, networks, or storage. Any data from anywhere is accessible.



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