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Digital Clouds are Brewing over Rural America

Key Points:

- The economic benefits from the hybrid cloud in rural America are compelling for both end users and service providers.

- Local telecom operators are well positioned to leverage legacy assets to support current and future data center market demand.

- The adoption of data centers and cloud-based applications has led to new managed services opportunities for local telecom operators.

- The lack of IT talent and fiber connectivity is impeding the rate at which new technologies are being adopted in rural America.

- Though progress is being made, it will take time for rural America to fully enjoy all the efficiencies and benefits the hybrid cloud offers.

Introduction

As organizations look for cost-effective ways to manage their IT operations, the hybrid cloud offers an attractive alternative to on-premise data centers. The hybrid cloud is defined as a computing environment that uses a combination of on-premise, private and third-party public cloud services.

Prior to the hybrid cloud, organizations owned and operated their own servers and data centers or didn't use a data center at all. The advent of the hybrid cloud enables organizations to more cost-effectively scale their IT resources and free up capital that can be deployed elsewhere.

Companies and organizations in rural America are adopting the hybrid cloud, but a lack of talent and adequate broadband coverage are barriers to wide-scale adoption. In this report we look at how rural America is adopting these technologies, what local telecoms are doing to gain exposure to this growing trend, and the associated economic benefits to rural America.

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EXHIBIT 1: Past, Unrealized and Potential Economic Benefits of Online Tools for Small Businesses in Rural America

	Benefits in the Past 3 Years	Unrealized Benefits in the Past 3 Years	Potential Benefits in the Next 3 Years
Percentage change in 3-year revenue	17.20%	18.30%	20.80%
Additional sales per year	$69.8B	$74.4B	$84.5B
Additional GDP per year	$38.7B	$41.3B	$46.9B
Additional jobs	296,288	316,605	360,054
Additional wages paid per year	$12.1B	$13.0B	$14.8B

Source: U.S. Chamber of Commerce and Amazon

Delivering Digital Tools

There is significant upside for small business owners in rural America if online tools and technologies are adopted on a deeper level, according to a recent report from the U.S. Chamber of Commerce and Amazon. The hybrid cloud plays a central role in this opportunity.

Per the report, nearly 20 percent of rural small businesses generate the vast majority of their revenue (80 percent and up) by selling their products and services online. It is estimated that over the last three years, digital tools and technology boosted sales in rural America by over 17 percent. Greater use of online tools could unlock the potential in rural America and increase sales by over 20 percent in the next three years (*Exhibit 1*).

Beyond economic benefits, the hybrid cloud also has important social benefits. One example comes from Kansas where rural Republic County Hospital replaced an expensive relationship with a radiology organization with a cloud-based, vendor-neutral system. The end result: The hospital cut their imaging costs in half, and their clinicians now have access to patient information through any internet connection.

Cutting costs is imperative to maintaining quality of service at rural hospitals. Hospitals are reimbursed by the federal government based on a formula that includes cost of living. The problem for rural hospitals is that the cost of living and health care costs are not increasing at the same rate. Therefore, adopting the hybrid cloud and realizing all the efficiencies that can be gained should be a major focus for rural hospitals.[1]

Opportunities for Rural Telecoms

As organizations in rural America look to adopt the hybrid cloud, the managed services market is becoming a larger focus for some rural operators. Among the valued services operators can provide to organizations:

- Guidance in defining an IT strategy. For example, deciding and prioritizing what activities should be in the cloud versus on their own infrastructure are complicated business decisions.

- Technical expertise required to implement new strategies.

- Manpower to manage these strategies.

Most rural organizations take a crawl, walk, run approach to their outsourcing strategy. But once they get comfortable with their service provider, they often choose to outsource the lion's share of their operations. These outsourcing services are a great way to strengthen the relationship between the provider and the organization, which ultimately reduces customer churn.

Rural telecom operators who have excess space in their central offices/data centers are offering hybrid cloud services to rural organizations. This business model allows rural organizations to free up capital that can be invested in other parts of the business, and enables them to focus on their core competencies. And there is the added benefit of dealing with a local trusted brand, which cannot be underestimated.

Many rural organizations are hesitant to move their data to the public cloud for two reasons:

- They are uncomfortable with not knowing where their data is physically located.
- They want local technical support.

Rural operators who offer hybrid cloud services are well positioned to address these concerns given their local presence.
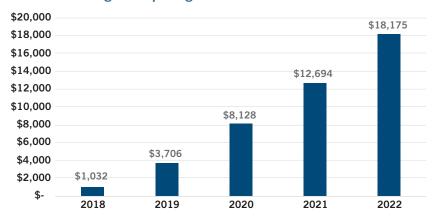
When organizations partner with a local telecom provider, they can physically see the data center where their data is located. Also, having a local presence gives organizations the confidence that their technical support needs will be met in a timely fashion and from a known and trusted provider.

Gaining an 'Edge'

For rural telecom operators, competing in the data center market where they don't have a distinct competitive advantage is problematic. But in the developing edge computing market, opportunities exist for rural operators. They can leverage their assets and take advantage of the growing demand for storage and computing at the edge (*Exhibit 2*).

As wireless networks evolve and low latency applications are deployed, the store and compute functions will need to be located much closer to where these applications are being used. Self-driving cars is a perfect example.

EXHIBIT 2: Edge Computing Revenue

Source: 451 Research and the OpenFog Consortium

> **Edge computing** is computing done at or near the source of the data to provide real-time local data analysis to devices, which can include everything from self-driving vehicles to digital billboards, wearable health appliances, and more.

Self-driving cars will generate a tremendous amount of data, which must be processed by complex algorithms in a data center. Data centers at the edge can determine what data must be processed at larger data centers versus that which can reside in edge computing facilities.

The ability to process data generated by self-driving cars in a handful of milliseconds can be the difference between life and death. In rural markets, the roadways are far away from most data centers. To access these data centers, applications in rural America are forced to take multiple hops through gateways and interconnections, which increases network latency. Eliminating such latencies is critical for self-driving cars.

Auto manufacturers and technology companies have been investing heavily in the self-driving car market. The technology is expected to deliver benefits such as increased road safety, improved fuel efficiency, reduced congestion, etc. Many rural operators have the data center/central office assets that well position them to provide the necessary infrastructure that reduces the aforementioned interconnects, without major capital investments.

Autonomous driving is just one example of how edge computing will be adopted. There are many more opportunities across numerous vertical markets where edge computing will play a vital role in the future. According to 451 Research and the OpenFog Consortium, the agriculture and industrial industries are verticals where edge computing is expected to be adopted on a large scale (*Exhibit 3*). These vertical market opportunities should play into the strengths of rural operators.
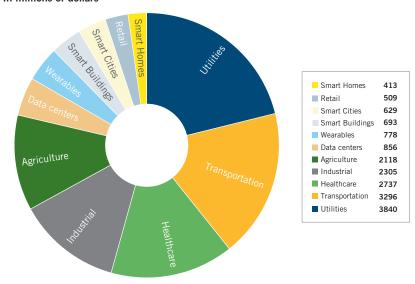
Cloud Expansion

The expected growth in IP traffic over the next few years is going to challenge the current data center architecture. According to recent estimates, approximately 90 percent of today's data was created in the last two years. This pace isn't likely to slow down thanks to artificial intelligence, self-driving cars, and 5G networks. Cisco estimates that North American IP traffic will grow at a compound annual growth rate of 21 percent between 2017 and 2022 (*Exhibit 4*).

Building large data centers is expensive and takes time. Distributing traffic to the edge is cost-effective and can help reduce security issues. The traditional cloud computing architecture is inherently centralized, which increases the risk of major security breaches and disruptive power outages. As IP traffic grows so do the security risks, so distributing the store and compute functions to edge locations can help address this issue.
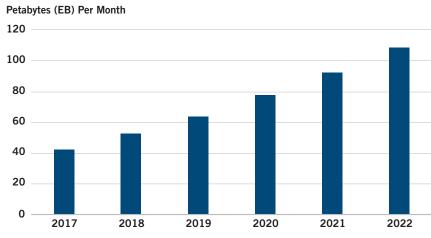
EXHIBIT 3: Edge Computing Opportunity by Vertical Market

In millions of dollars

Smart Homes	413
Retail	509
Smart Cities	629
Smart Buildings	693
Wearables	778
Data centers	856
Agriculture	2118
Industrial	2305
Healthcare	2737
Transportation	3296
Utilities	3840

Source: 451 Research and the OpenFog Consortium

EXHIBIT 4: IP Traffic, 2017-2022

Petabytes (EB) Per Month

Source: Cisco

On the cost side, being able to leverage legacy infrastructure (telecom central offices, wireless cell towers) where power and connectivity are already in place can reduce data center costs. These trends play right into the hands of rural telecoms and rural wireless tower owners.

Overcoming Challenges

The urban-rural digital divide has been well documented. This lack of connectivity does pose some challenges for edge computing growth, and the adoption rate of cloud computing in rural America.

The other major challenge is the lack of qualified IT talent. There are still many organizations that have yet to adopt a hybrid cloud strategy thanks to the IT knowledge gap in rural America. Developing and executing an IT strategy to move activities to the cloud is a complicated process. To a certain degree, rural America finds itself in a bit of a vicious circle. The lack of broadband connectivity has led to a brain drain in rural America, but without strong IT talent it is difficult to grow the hybrid cloud market.

Conclusion

The economic and social benefits of the hybrid cloud in rural America are encouraging. These include job growth, improved health care, and efficiencies in farming operations. The new business opportunities these technologies offer will help offset regulated revenue declines for local telecom operators. Offsetting the opportunities are challenges, namely a lack of qualified IT talent and porous broadband coverage. Progress is being made, but impediments are slowing rural America's opportunity to fully realize all the benefits these technologies have to offer. ▪

Sources Cited

[1]https://hitconsultant.net/2018/08/29/4-ways-healthcare-it-can-save-rural-hospitals/#.XL4gA5hKi70

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