A Strategic Framework to Create the World's Next Global Internet Hub

Presented by RVA757 Connects

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RVA757 Connects is a 501(c)(3) advocacy group supporting the economic success of the Richmond and Hampton Roads regions, also known as the I-64 Innovation Corridor.

One of RVA757 Connects' top priorities is making the I-64 Innovation Corridor a Global Internet Hub (GIH), one of the world's major digital interconnection points. To this end, RVA757 Connects created the GIH Steering Committee comprised of leaders across 10 different industry categories (see pages 29-31) to develop a strategic vision and action framework that would accelerate the I-64 Innovation

The development of the GIH Strategic Plan was funded, in large part, by a grant from GO Virginia, a state-funded initiative administered by the Virginia Department of Housing and Community Development (DHCD). GO Virginia strengthens and diversifies Virginia's economy and fosters the creation of higher wage jobs in strategic industries. GO Virginia Region 4 (Richmond) and Region 5 (Hampton Roads) each contributed $50,000 to support the planning efforts. Additional financial support was provided by Dominion Energy, Henrico County, the City of Virginia Beach, the Hampton Roads Alliance, Old Dominion University, and the Dragonfli Group.

RVA757 Connects'
Global Internet Hub Strategic Plan

I. Introduction:

The combined digital infrastructure assets of the Richmond (RVA) and Hampton Roads (757) regions are building the foundation for the I-64 Innovation Corridor to become recognized around the world as a Global Internet Hub (GIH). Attaining this recognition will transform the economic trajectory of both regions and have a positive impact across the Commonwealth. The I-64 Innovation Corridor is well-positioned to grow its digital infrastructure far more rapidly than it has during the past decade, especially if leaders are guided by a vision that explicitly builds upon the unique advantages of our distinct blend of network infrastructure. We have industry-leading international subsea cables that land in Virginia Beach. Those subsea cables are connected to world-class data centers including Meta, QTS, Globalinx, and others. DE-CIX, a leading internet exchange operator, has established nodes in Henrico and Hanover counties.

The megaregion must capitalize on these unique digital assets and growing digital investments to create a thriving interconnection hub. Not doing so has serious consequences.

The Richmond and Hampton Roads regions are falling behind other localities and regions we compete against for new business expansion and relocations. This is especially true in the fast-growing digital economy where IT and tech job growth, aggregate worker productivity, and overall gross domestic product (GDP) gains lag behind both competitor regions and national averages.

To seize this opportunity, RVA757 Connects, a 501(c)(3) comprised of the top business, academic, and nonprofit leaders from both regions, established a Steering Committee of more than 60 leaders from 10 separate industry categories to create a comprehensive strategic plan.

The clarion call to the Steering Committee was to develop a vision, goals, and an action framework that will capitalize on the combined digital assets of Richmond and Hampton Roads in a way that drives the overall economic prosperity of both regions. This is a classic case where the whole is greater than the sum of its parts.

This document is the Steering Committee's report. The work of the Steering Committee and the supporting research are on the planning initiative's website — www.GlobalInternetHub.org.

We thank the future-forward perspective of GO Virginia Region 4 (Richmond) and Region 5 (Hampton Roads) for their financial support of this planning effort. In addition, we thank the six organizations that provided the required matching funding. This includes Henrico County, the City of Virginia Beach, Dominion Energy, Hampton Roads Alliance, Old Dominion University, and the Dragonfli Group, a cybersecurity firm.

The GO Virginia grant enabled the Steering Committee to engage TeleGeography and InterGlobix, two leading international digital infrastructure consultants. These firms were charged with identifying relevant insights from the performance and growth of other global interconnection hubs and assessing the relative performance of the I-64 Innovation Corridor as an internationally competitive global interconnection hub. In addition, the Steering Committee

engaged SIR, a Richmond-based market research and strategy development firm, to assess the IT/tech-related comparative job growth of the Richmond and Hampton Roads regions.

The Steering Committee concluded that the I-64 Innovation Corridor has the technical potential to be considered a Global Internet Hub. In fostering greater industry-wide collaboration and coordination and public-private partnerships, we are confident that we can realize the full promise and potential of the I-64 Innovation Corridor as a Global Internet Hub.

II. Benefits of Being a Global Internet Hub:

Attaining the status of a Global Internet Hub, however, is not for mere recognition, but rather for transformational possibilities that the growth of world-class digital infrastructure will mean for our businesses, communities, and the future equitable growth of Richmond's and Hampton Roads' economies.

Driving Economic Development

Established in a thoughtful and coordinated manner, the Global Internet Hub can become a primary driver of economic development in the Corridor. In his 1890 book *Principles of Economics*, Alfred Marshall put forth the theory that concentrating industries in specific regions creates advantageous environments for economic growth. Clusters create economics of agglomeration, which benefit industries, cutting the need for long-distance transportation and building pools of easily accessible talent and resources. The same theory applies even today to digital hubs. Global Internet Hubs around the world attract a growing level of business interest and investment.

> "Digital infrastructure is to the RVA's and 757's 21st Century economy what Interstates 64 and 95 were to our 20th Century economy. Digital infrastructure is the currency and opportunity of our times."
>
> **Anthony J. Romanello**,
> Executive Director
> Henrico County Economic Development Authority

Digital hubs drive economic development in a four-stage process:

- In the initial phase, a data center hub grows and increases in importance as more networks establish themselves in the area. An extensive network of engineering firms and contract service providers increase their local workforce to support growth and continual upgrades. This includes a combination of trenching roads to install dark fiber cables, and "lighting up" the fiber to provide "lit" services. Various types of network companies exist that offer such "dark" and "lit" fiber network services.

- In the second phase, tech talent is attracted to the growing data center cluster. A vibrant, growing internet ecosystem attracts talent, particularly related to application development and commercialization. Easy access to the underlying technologies is an essential resource, but the large-scale changes in workforce demand are often driven by the "user community" (those who use these technologies to create new products and services), as well as lower costs and increased access to new opportunities. This is known as application development and commercialization, and virtually all businesses

directly benefit from the effective adoption of new digital technologies. But the real benefit is for the community, as this activity evolves into a major internet exchange point.

- In the third phase, companies are attracted to major "exchange point" hubs, realizing the benefits of hyperconnectivity, digital speed, massive real-time data acquisition, access to computing capabilities such as ML (machine learning) and AI (artificial intelligence), and the growing pool of tech and tech-adjacent talent. As part of the ecosystem development, various companies come together for a natural "marketplace" wherein they connect to one another and exchange traffic. This, in turn, leads to the development of an internet exchange.

- In the culminating stage, success fuels momentum. More companies are attracted to the region. Existing companies expand. New companies are started. The outcome is a 21st-century equitable economy growing the industries, companies, and jobs of tomorrow. Economic growth thrives on the heels of robust digital infrastructure growth.

Enhancing Municipal Budgets

The benefits that data centers have provided to municipal budgets have been substantial. A report from Mangum Economics examining the contribution of data centers to Virginia's economy notes that "because data centers are very capital-intensive, they have a disproportionate impact on local property tax revenue, while making minimal demands on local services." The report quantifies the nature of the benefit by noting that in the two largest data center locations in NOVA (in Loudoun and Prince William counties), data centers provide "a greater than 8-to-1 benefit to cost ratio, enables these localities to draw $13.4 million a year less from the state general fund for school budgets, and reduces local property tax rates from what otherwise would be required to fund county operations." Taxes on Loudoun's 20 million square feet of data center projects generate 24% of the county's general fund.

In essence, data centers have provided localities with revenues to keep taxes steady or low, while enabling the quality of services to be enhanced. The need for more data centers and the trend toward geographic dispersion should distribute the tax benefits of data center location to a larger group of local governments.

> "As the president of InterGlobix, I travel the world helping companies and communities develop their digital infrastructure. I thought I had seen everything, but this Global Internet Hub Strategic Plan is a first. This is the first time 60-plus leaders from two neighboring regions have worked together to create a comprehensive strategic plan to become a Global Internet Hub. – not as a city, but as a megaregion. Your vision and unprecedented collaboration have already put Virginia's I-64 Innovation Corridor in a growing number of conversations across the globe about emerging Global Internet Hubs."
>
> **Vinay Nagpal**,
> President of InterGlobix
> Executive Director and Founding Member of IEIC

Supporting Community Needs

The combination of increased revenue to local governments and additional fiber connectivity that a Global Internet Hub provides will have wide-ranging impacts on a community's quality of life. A sampling of these benefits includes:

- **Bridging the Digital Divide:** Companies are not the only ones to benefit from increased internet infrastructure. The entire community will have faster, more reliable internet, providing high-speed connections to everyone. This includes neighborhoods and corridors previously lacking access. The equity advantages of a Global Internet Hub, organized intentionally, can make a significant dent in addressing the digital divide in both urban and rural areas. Having access to high-speed internet connectivity at home and school enables everyone to be prepared for tomorrow's jobs. It levels the playing field regardless of affluence level or geographic location. From 2018 to late 2021, Virginia invested more than $846 million to connect more than 429,000 Virginia homes, businesses, and community anchors to broadband service. Virginia also started in late 2021 to allocate more than $722 million to provide universal broadband infrastructure in 70 localities, which will close 90% of Virginia's digital divide. According to the Virginia Department of Housing and Community Development (VDHC), the goal is for Virginia to achieve universal broadband access by 2024.

- **Lowering Internet Costs:** Being located near an internet hub decreases the operating costs of internet service providers, allowing the savings to be passed along to the end user. Internet hubs ensure that local internet traffic passes through cheap, local connections rather than more expensive, international links. As a sizable portion of internet traffic is typically local, the cost savings are real. With the implementation of an internet exchange, the local traffic is kept local, saving significant backhaul charges, thereby reducing the overall cost and making the internet more cost-effective both for the internet service providers (ISPs) and for the consumers.

- **Advancing Smart City Initiatives:** More robust local networks will enable jurisdictions in the region to modernize and help establish unified 911 centers that allow all facilities access to the same network. This enables data sharing between all 911 departments and improves regional natural disaster recovery. A more sophisticated digital network will support autonomous commercial and residential vehicles.

- **Improving and Modernizing Healthcare:** The COVID-19 pandemic super-charged telemedicine, and it has become integrated in the routine practice of medicine everywhere, no longer only a niche product to serve communities without adequate medical personnel. Advanced digital infrastructure and associated data analytics/ML are essential to participating in advancements in precision medicine that are driven by various eHealth initiatives, including but not limited to genomics, proteomics, and advanced imaging. A larger local network enables greater remote access to doctors and specialists and allows healthcare providers to extend their range of services. Increased bandwidth and proximity to large data centers also enable healthcare facilities to quickly share copious amounts of data and provide secure storage for medical records. It also grants healthcare providers access to advanced medical research across the globe to take better care of our citizens.

- **Enhanced Educational Opportunities:** Regional connectivity facilitates the integration of higher education for collaborative research, provides the bandwidth necessary for growing educational needs (such as virtual learning platforms), and increases enrollment, retention, and graduation rates. These improvements are in addition to the increased investment in computer science education. Having enhanced educational

opportunities will help attract more tech jobs, which means higher-paying job opportunities and more college graduates staying in the megaregion.

- **Remote Work Advantages:** The COVID-19 pandemic also changed how we work. As restrictions lift, many companies are continuing to allow employees greater flexibility in working from home. Access to reliable, high-speed internet makes this possible. Being an internet hub will make locations even more attractive for both companies and workers embracing a work-from-home model. This is particularly important for the Hampton Roads region, as it is home to the largest naval base in the world. The Navy recently declared that it expects at least one-third of the supporting personnel in its base locations to telework, and this ability will be a consideration in future BRAC decisions.

- **Supporting the Growth of the Internet of Things:** A growing number of consumer products are embedded with computer chips and sensors that use the internet to transfer data by connecting wirelessly to servers located in the cloud. In fact, the Internet of Things (IoT) and 5G networks are ushering in a new form of local computing. Edge Computing enables data from Internet of Things devices to be analyzed and used at the edge of a network before being sent to a data center or cloud. The biggest benefit of Edge Computing is the ability to process and store data faster, allowing for more efficient applications for businesses, including retailers and manufacturers. The "Worldwide Edge Infrastructure (Compute and Storage) Forecast, 2019-2023" report predicts that edge infrastructure is poised to be one of the main growth engines in the server and storage market for the next decade and beyond. The Internet of Everything (IoE) describes a world where billions of objects have sensors to detect, measure, and assess their status and are all connected over public or private networks using standard and proprietary protocols.

- **Supporting the Growth of Artificial Intelligence:** At the forefront of all disruptive technologies is Artificial Intelligence (AI) and machine learning (ML). These revolutionary tech breakthroughs depend on data and access to it to work. A more robust regional digital infrastructure enables this access.

- **Future-Proofing Communities:** Every "next generation" of technology adds new functionality, capacity, and performance, often by an order of magnitude. The leading-edge hub regions and users will have digital resources, tools, and capabilities that are not widely accessible to others — real-time massive data acquisition/analytics, use of augmented intelligence, and creation of new, highly beneficial knowledge. All of this will drive the winning cities of tomorrow — future economic growth and prosperity.

III. Situation Overview:

The Situation Review conducted by the Steering Committee identified 10 key characteristics of a Global Internet Hub. These include technical features such as subsea cables and interconnected terrestrial networks; enabling features such as available and reliable power and relatively inexpensive land; and translational features such as a tech-savvy workforce, effective economic incentives, and enlightened business leadership.

Key findings and planning insights that came from this collective research include:

1. **By all accounts the worldwide volume of data is exploding exponentially.**

   This is creating opportunities for cities and regions to become digital infrastructure hubs, realizing the advantages that come with being part of the growing backbone of the digital economy.

   The digital infrastructure is the foundation of a digital economy. For 50 years, data creation improved linearly. It is now improving exponentially**.** About 90% of all data that exists today was created in the last two years. Internet traffic has increased five times in the past five years. Growth of the use of Artificial Intelligence (AI) is also increasing the amount of data.

   About 22 billion devices were connected in 2018. It is estimated that the number of connected devices will grow to 38.6 billion by 2025 and to 50 billion by 2030. Data consumption growth by these devices is also growing rapidly. In 2010, 2 zettabytes of data were consumed. That number jumped to 33 zettabytes in 2018 and to 74 zettabytes in 2021. By 2024, it is estimated the figure will be 149 zettabytes.

   Regions that grow their digital infrastructure and increase their supply of qualified tech talent workers will increase the number of high-wage earners, attract cutting-edge businesses, and improve their ability to make effective social investments from the additional tax revenues that accrue. Regions that do not participate fully in the emergent digital economy are likely to lag in job and income growth, become less attractive to firms and entrepreneurs at the forefront of the future economy, and will have fewer resources to serve their stakeholders.

2. **The Richmond and Hampton Roads regions lag in key indicators: IT/tech job growth, workforce productivity, and GDP.**

   IT/tech talent jobs will be vital to the competitive position in the foreseeable future.

   From 2013–2022, job growth in digital infrastructure-enabled occupations, as defined by the Greater Richmond Partnership's list of relevant Bureau of Labor Statistics SOC codes, increased nationally by 3.1%. This includes software developers, data analysts, information security analysts, and web developers.

   In 2022, the average U.S. annual wage for these occupations was $111,800. Job growth in IT/tech occupations in regions with advanced digital infrastructure grew faster – by 4.54%. RVA's and 757's direct competitors' IT/tech talent grew by 3.54%. In stark comparison, those occupations in the RVA and 757 regions grew an anemic 1.19%.

   The table on the following page summarizes this comparison. This insight comes from SIR's mining of national data using Chmura Economics & Analytics' labor market software, JobsEQ. Dr. Terry Clower from George Mason University conducted a similar analysis using Lightcast's labor force data tool. The Lightcast data and analysis produced the same results as SIR.

   The correlation (not causation) between the growth of IT/tech jobs, aggregate worker productivity, and overall GDP economic growth, and RVA's and 757's lackluster performance are the headlines here.

Labor forecasts for the next decade, at the national and state level, consistently project that jobs in the digital economy (and in healthcare) will be the fastest growing sectors among professions that pay above-average wages. Success in building digital infrastructure and creating and attracting tech jobs will be vital to the competitive position of states and regions in the foreseeable future.

Metropolitan Statistical Area (MSA)	Total Tech Jobs 2022	10-Year Tech Job Annual Growth Rate	Average 2022 Tech Job Wages	10-Year Worker Productivity Total Growth	10-Year GDP Total Growth (All Industries)
USA – Total	**5,850,692**	**3.1%**	**$111,800**	**31%**	**47.4%**
Mature Digital Infrastructure MSAs*					
Seattle	176,170	5.2%	$140,000	51%	85.1%
Denver	95,663	4.8%	$118,800	30%	63.0%
Dallas	187,019	5.1%	$110,100	28%	64.9%
Atlanta	129,922	3.5%	$113,000	31%	60.7%
Jacksonville	24,111	3.7%	$99,500	26%	56.6%
Portland	60,125	3.0%	$116,000	35%	57.4%
		4.54% Avg.* **	**$116,233 Avg.**	**33.5% Avg.**	**64.6% Avg.**
RVA & 757's Direct Competitors**					
Nashville	35,538	5.4%	$93,500	30%	74.6%
Raleigh	42,056	4.2%	$114,500	34%	72.3%
Charlotte	54,435	4.5%	$113,100	29%	68.6%
Miami	91,494	4.0%	$100,400	35%	62.1%
Orlando	43,097	4.7%	$100,600	27%	57.4%
Tampa	52,474	4.1%	$99,900	31%	60.8%
Myrtle Beach	2,873	3.8%	$84,800	26%	53.3%
Atlanta	129,922	3.5%	$113,000	31%	60.7%
Jacksonville	24,111	3.7%	$99,500	26%	56.6%
Charleston	11,116	4.3%	$99,200	40%	74.1%
New Jersey	180,936	2.0%	$119,700	26%	35.5%
		3.54% Avg.* **	**$103,473 Avg.**	**30.0% Avg.**	**56.8% Avg.**
I-64 Innovation Corridor					
Richmond	24,900	1.5%	$107,900	26%	39.9%
Virginia Beach/Norfolk	25,879	0.9%	$103,900	23%	26.7%
		1.19% Avg.	**$105,900 Avg.**	**24.5 % Avg.**	**33.0% Avg.**

List provided by TeleGeography and InterGlobix based on population size* * List provided by Greater Richmond Partnership* **** Weighted average*

3. **When viewed together, the Richmond and Hampton Roads regions can, realistically, grow into a Global Internet Hub to help attract tech talent and drive economic growth.**

The I-64 Innovation Corridor has a growing and impressive list of digital assets. This includes three active subsea cables coming ashore in Virginia Beach, a subsea carrier-neutral colocation data center in the Corporate Landing Business Park in Virginia Beach, a new cable landing site in Sandbridge, and a fiber network ring that is under construction in five Hampton Roads cities.

The megaregion is also home to two huge data center campuses located and growing in eastern Henrico County – Meta (Facebook's parent company) and QTS. Meta invested more than $1 billion in building a 2.5 million-square-foot data center campus that is now fully operational. QTS is in the process of doubling in size by expanding its campus by another 1.5 million square feet to have a total of approximately 3 million square feet. QTS is already the fourth-largest data center in the world and hosts a prominent Network Access Point (NAP) in the Mid-Atlantic region. Within the past year, the global internet exchange DE-CIX established three data-center-neutral exchange nodes in the Richmond region, bolstering local connectivity and enabling networks in the region to reach partners across the worldwide DE-CIX network.

The I-64 Innovation Corridor also has relatively inexpensive land, access to reliable and affordable power, and over a dozen independent data centers.

> "Virginia Beach serves the global subsea cable industry as its next generation connection point. Today we have three of the world's fastest cables connecting Virginia with Europe and South America. Importantly, there are four more permitted bore pipes into the ocean which will accommodate additional subsea cable landing opportunities. Construction is ready to start this year with a completion date of 2024. This is being driven, in large measure, by private sector investment attracted to the opportunities unfolding in Virginia Beach. All of this is possible, in part, due to our effective partnership with the RVA757 Connects initiative. We look forward to advancing Virginia's digital position in a highly competitive industry and ever-changing environment."
>
> **Charles J. Bauman III**,
> Business Development Coordinator
> City of Virginia Beach
> Economic Development

More digital infrastructure is filling in along the Corridor. This includes a 119-mile, 288-strand fiber network ring that is being built to serve five Hampton Roads cities – Virginia Beach, Chesapeake, Portsmouth, Norfolk, and Suffolk. Future phases include connecting all 17 cities and counties including those localities on the Peninsula. There are also growing investments in new data centers. All of this gives the Corridor distinct advantages.

In addition to these tangible assets, consultants noted that the strategic planning effort itself, bringing together more than 60 leaders from 10 separate industry categories, represents a unique and unprecedented level of intentionality that is getting noticed in global industry circles.

4. **There are tremendous benefits to becoming a Global Internet Hub.**

   The research findings reaffirmed that pursuing international Global Internet Hub recognition is not for the designation itself, but rather for what an advanced and growing world-class digital infrastructure will mean for Richmond's and Hampton Roads' businesses, communities, and the equitable economic growth of both economies.

   The Steering Committee agreed. The creation of a Global Internet Hub holds great potential for driving economic development throughout the I-64 Innovation Corridor in a more dynamic and equitable manner that will help create the industries, companies, and jobs of tomorrow.

   Data centers in Virginia have provided substantial benefits to municipal governments, enabling them to keep taxes steady while offering enhanced services. Locating more data centers in the megaregion will distribute tax benefits to a larger group of local governments. In addition, the combination of increased revenue to local governments and additional fiber connectivity that a Global Internet Hub provides will have wide-ranging impacts on a community's quality of life. A Global Internet Hub will help to bridge the digital divide, lower internet costs, modernize healthcare delivery, advance Smart City initiatives, enhance educational opportunities, and "future-proof" communities.

5. **Intentionality is the leading key to success.**

   The consultants reviewed global interconnection hubs for insights that could inform the advancement and growth of Richmond and Hampton Roads' digital infrastructure. The resulting case studies pointed to many insights with intentionality topping the list.

   A high degree of intentional collaboration and coordination among digital ecosystem players makes a significant difference in driving digital infrastructure growth. This includes terrestrial network owners, subsea cable investors, internet exchanges, data centers, large carriers, and local governments fully engaging in a "rising tide lifts all ships" approach, growing the market in a way where everyone, including direct competitors, benefits.

6. **Building digital infrastructure "neutrality" and orchestrating a comprehensive game plan are also two proven pathways to transformation.**

   The secret to the success of Marseille, France, in becoming a Global Internet Hub – and the formula now being followed by other emerging hubs around the world – is building interconnectivity. Infrastructure neutrality means being carrier-neutral, data center-neutral, and network-neutral.

   While this may be easier to do in Europe where digital access is viewed more as utility, it must become a defining trait of our megaregion if we want to play on a world stage and realize the truly transformative benefits for our two regions.

   Another success factor is being truly expansive. There is no silver bullet. A winning approach includes multiple action steps. This includes increasing the number of subsea cables, diversifying cable landing stations, enhancing local interconnectivity, building data centers, and institutionalizing collaboration across various sub-sectors of the digital infrastructure industry and across different regions.

7. **Time is of the essence.**

   Cities and regions around the world are now aware of the value of becoming a major global interconnection point.

   Within the last two years, Myrtle Beach, S.C., secured permits for its first subsea cable landing site. Industry rumors point to a North Carolina announcement soon. Ten to 12 cables are expected to land on the East Coast in the next 10 years. These infrastructure investment decisions are being made now.

   Based on the situation review, the Steering Committee arrived at three interrelated conclusions:

   - If there ever was a case for Richmond and Hampton Roads to work together, it's on the opportunity to become a Global Internet Hub;
   - Our success could transform the Hampton Roads and Richmond economies; and
   - We need to act now.

IV. Strategic Recommendations:

Based on the Situation Review and the consultants' findings, the Steering Committee developed a vision, goals, and 10 strategic recommendations across four categories of needed actions.

Vision:

> *Virginia's I-64 Innovation Corridor will be internationally known as the world's first megaregion to become a Global Internet Hub (GIH), with a deep sense of intentionality and urgency, playing an increasingly vital role in the world's growing digital backbone. Through unprecedented local collaboration, coordination, and investment, our expanding digital infrastructure will transform Richmond's and Hampton Roads' workforce productivity, industry attraction and retention, GDP, and overall inclusive economic prosperity.*

Goals:

The Steering Committee members were clear that their vision was guided by three goals inspired by who the ultimate beneficiaries should be in making the I-64 Innovation Corridor a Global Internet Hub.

1. **Make Inclusive Economic Opportunity a Primary Goal.**

   From the outset, Steering Committee members asked one another "Why does the world need another Global Internet Hub?" The consistent answer was that the I-64 Innovation Corridor should become an international example of how ensuring the growth of the digital economy leads to equitable digital access, seamless transitions to new digital jobs, and inclusive economic prosperity.

2. **Serve ALL Communities in the Corridor.**

   Steering Committee members want to ensure that the megaregion's Global Internet Hub is developed to benefit underserved communities in ways that are not being done today, such as improving educational opportunities and incubating innovation centers for small businesses.

3. **Generate Local Jobs and Local Return on Investment (ROI).**

   Committee members want to ensure that the economic benefits of expanding the digital infrastructure accrue to the citizens and communities within the megaregion and do not simply benefit organizations and companies that have minimal connection and commitment to Richmond and Hampton Roads.

Strategic Recommendations:

To achieve this vision and related goals, the GIH Steering Committee arrived at four broad pillars of the I-64 Innovation Corridor Global Internet Hub Strategic Plan:

- **Organizational Support –** Stand up the RVA757 Connects' Global Internet Hub Council to take advantage of the momentum that the planning process created. Turn the Steering Committee into the I-64 Innovation Corridor's digital infrastructure industry association.

- **Outreach and Education –** Advance the outreach and education necessary to reach and educate local stakeholders within the I-64 Innovation Corridor and domestic and global digital infrastructure investors to support and invest in the development and growth of the I-64 Innovation Corridor as a Global Internet Hub.

- **Digital Infrastructure –** Build out the foundational digital infrastructure needed in the I-64 Innovation Corridor — underlying dark fiber networks, terrestrial networks offering lit services, subsea cables, IXs and IXPs, data centers, and municipal fiber rings — to become a Global Internet Hub.

> "The RVA757 Connects Global Internet Hub Steering Committee work has exceeded my expectation. Our diverse group of 60-plus leaders across a dozen categories has created a solid roadmap to solve the digital divide and strategic connectivity growth in the region.
>
> One of the inspired recommendations is turning the Strategic Plan's Steering Committee into an ongoing industry council. A great team accomplishment! This will create an organizational structure that will be responsible for the Plan's execution and be held accountable to results. I am all in."
>
> **Scott K. Brown**,
> President
> Pixel Factory Data Center Inc.

- **Resources and Incentives –** Fuel the growth of the Global Internet Hub through a growing supply of tech-savvy workers and a pro-business environment.

These pillars comprise 10 strategic recommendations, the strategic imperatives that will enable the I-64 Innovation Corridor to compete effectively for the high-paying jobs that the emergent digital economy is projected to create over the next decade.

1. Establish a Global Internet Hub Industry Council.

The Steering Committee enthusiastically endorses the formation of a Global Internet Hub Council to build upon the momentum of the planning process and to be responsible for implementing its recommendations.

Prior to the creation of this Strategic Plan, the organizations and businesses in the I-64 Innovation Corridor related to digital infrastructure were not thought of, coordinated, or supported as a unified industry. The creation of a GIH Steering Committee was the first major step in building a unified ecosystem. Members included represented subsea cable owners, fiber network firms, cyber companies, utilities, local governments, higher education, planning agencies, chambers, economic development organizations, and four branches of the military.

The planning process that culminated in this Strategic Plan demonstrated to Steering Committee members the value and related benefits of a well-coordinated effort. Appropriately, the Steering Committee recommends the establishment of a formal and ongoing Global Internet Hub Industry Council that will include the Steering Committee members as the founding members of this association. Invitations will be extended to major carriers (including Verizon, Comcast, and Cox) and the trade associations representing them, as well as city and state government representatives and leaders of institutions of higher education, including community colleges, and workforce development organizations.

This approach to building the corridor's digital infrastructure is similar to the successful model that has been initiated in the Richmond-Petersburg regions with the Alliance for Building Better Medicine to support the emergent pharmaceutical manufacturing cluster. In a little more than 12 months, the Alliance for Building Better Medicine has been successful in developing regional and state support for major infrastructure improvements in Petersburg, in being awarded a $70 million grant from the federal Economic Development Administration, and in building significant educational partnerships between Virginia Commonwealth University and Virginia State University, with the region's community colleges, and with K-12 career education programs.

The GIH Council will support and advance the following nine strategies required to build out a Global Internet Hub for the RVA757 megaregion.

RVA757 Connects will serve as the initial home and incubator of the Global Internet Hub Council, which will start as a division of the larger organization. The Council's charge will be the management and coordination of plan implementation as well as seeking funding for its work (including sponsorships, grants, and budget allocations) and convening quarterly meetings. When appropriate, the Council can be spun off into a standalone 501(c)(3) – I-64 Innovation Corridor Global Internet Hub Council.

2. Through outreach and education, increase awareness, familiarity, and support among local stakeholders in the I-64 Innovation Corridor for digital infrastructure development.

Development of a region's digital infrastructure and pursuit of international hub status will require the support and coordination of multiple stakeholders — businesses, government agencies, local and state-level elected officials, and community groups — over an extended period.

Most stakeholders understand that the digital economy is producing many high-paying jobs, and economic development officials in the megaregion actively court firms seeking to relocate their tech operations from high-cost areas in the Northeast. Local governments increasingly recognize the economic value that data centers can bring, paying substantial local taxes while not requiring the roads and schools that accompany other forms of commercial and residential development.

> "The growing demand for data centers and digital infrastructure present a huge opportunity for the I-64 Innovation Corridor. Mining this opportunity starts with educating leaders on what this means for every locality in the corridor. The GIH Strategic Plan leads the way, calling for an organized outreach and educational program that will inform stakeholders from local government and elected officials to developers and property owners. We welcome the opportunity to be part of this initiative."
>
> **Stan Blackwell**,
> Director of Customer Service and Strategic Partnerships
> Dominion Energy

At the same time, most are not familiar with the bigger picture – the digital infrastructure ecosystem and the interdependence of a Global Internet Hub's technical components — terrestrial networks, subsea cables, IXs, ramps, and municipal rings — and are not fully aware of the wide range of benefits that justify the investment in this ecosystem.

A principal assumption undergirding the work of the GIH Steering Committee is that if a region is not developing a robust digital infrastructure, it is likely to fall behind in the competition for good, high-paying jobs in the emergent economy.

The GIH Steering Committee strongly recommends that the new GIH Industry Council, in partnership with state, regional, and local economic organizations, develop effective materials and methods for communicating the value that a Global Internet Hub can provide for the megaregion, for individual communities, for the business community, and the broader citizenry.

The Alliance for Building Better Medicine is again a very useful model as it has been extremely successful in conveying how the application of sophisticated chemical engineering processes to improve the manufacturing of generic drugs will result in the creation of high-paying research and manufacturing jobs in the Richmond-Petersburg region.

Examples of the relevant activities that the GIH Council will undertake include:

- A presentation deck that explains the essence of the Global Internet Hub and the benefits that will accompany it to audiences that are basically unacquainted with the concept.

- An outreach program to local leaders and government officials in all communities that make up the Richmond and Hampton Roads regions that explains the power and return on investment of a robust digital infrastructure.

- A certification program that can designate localities as Global Internet Hub-ready communities. This program can be designed and orchestrated in partnership with Dominion Energy and the Virginia Economic Development Partnership.

- Create a public-facing dashboard of key performance indicators that charts the performance and relative success of the I-64 Innovation Corridor's digital infrastructure development.

- Represent the megaregion in global conferences and secure speaking engagements to promote the region and further enhance and stimulate the growth of the development of digital infrastructure in the region.

3. Increase international awareness of and familiarity with the I-64 Innovation Corridor among the global digital infrastructure community, in general, and digital infrastructure investors, in particular.

The outreach and education efforts inside the megaregion will be complemented by an initiative to increase international awareness of the I-64 Innovation Corridor among the global infrastructure community and investors.

NOVA and Ashburn's Data Center Alley are top of mind when global industry leaders think of Virginia and its digital assets. Comparatively, the I-64 Innovation Corridor is unknown in the global digital infrastructure world. While not very large, the digital infrastructure investor community is challenging to reach as it is comprised of a set of vertical sub-industries — terrestrial networks, carriers, content providers, data centers, and subsea cables — and not around topics such as Global Internet Hubs or the comprehensiveness of a region's entire digital infrastructure. There are vertical trade groups serving each niche.

The GIH Steering Committee's emphasis on developing a Global Internet Hub and articulating a strategy for coordinating the principal elements of the I-64 Innovation Corridor's digital infrastructure is being recognized as a unique approach. One takeaway from the worldwide Internet Ecosystem Innovation Committee (IEIC) conference held in Henrico in November 2022 was that the intentional planning effort of the RVA757 Connects' Steering Committee is the first effort of its kind – *in the world!* InterGlobix and TeleGeography, two international consultants hired by the Steering Committee, also confirmed that RVA757 Connects is an emerging international digital infrastructure industry model. Putting this all together is why *the next Global Internet Hub isn't a city, but rather a megaregion.*

The value of future outreach and education by the new GIH industry Council was confirmed recently when representatives from Chirisa, a global investor active across digital infrastructure, communications, and real estate in Europe and the Americas, recently contacted RVA757 Connects to inquire about the I-64 Innovation Corridor's Global Internet Hub strategic planning initiative. Chirisa requested a copy of our strategic plan to share with its investors and to be invited to join the GIH Industry Council once it is launched. The company's representatives also took our advice and immediately reached out to our economic development agencies.

All of the Global Internet Hub Council's outreach and education will be seamlessly coordinated with the marketing efforts of the Virginia Economic Development Partnership (VEDP), the Hampton Roads Alliance, the Greater Richmond Partnership, and local economic development agencies. A sampling of steps that will be undertaken include:

- Maintaining and updating the Global Internet Hub website (www.globalinternethub.org, .com, and .net) where this Strategic Plan and related source materials are inventoried.
- Placing an Executive Summary map of the RVA757 Connects I-64 Innovation Corridor's digital assets and Strategic Plan highlights in global trade organization publications.
- Creating a roadshow presentation and brochure about the I-64 Innovation Corridor as a GIH for VEDP, the Hampton Roads Alliance, the Greater Richmond Partnership, and local economic development agencies to use as needed.
- Attending and presenting at the most important GIH international events.
- As requested, supporting regional and local economic organizations with customized presentations to industry investors.
- Turning over all digital infrastructure leads to regional and local economic organizations. This effort has already begun and will be accelerated and coordinated to become even more successful.

Time is of the essence on the internal and external marketing front as jurisdictions across the world are on to the benefits of becoming an interconnection hub.

4. Support the growth of robust local internet networks and routes connecting other hub markets.

The I-64 Innovation Corridor has established local terrestrial networks and routes connecting the region to other hub markets. While existing networks are in place, some of the more rural portions of the megaregion still lack broadband access.

The megaregion will become home to the most robust and growing local network, one that demonstrates that an important value of our Global Internet Hub is ensuring broadband access to all residents across the entire megaregion.

- The GIH Council will, to the extent possible, further understand the increasing demand on our megaregion's digital infrastructure due to the expected demand for 6G and the growth of data related to the Internet of Things.

- In addition, the GIH Council will create a comprehensive inventory of established and planned networks. This inventory can be published and shared on a regular basis with digital infrastructure leaders to ensure that local networks are keeping up with market demand and anticipated future needs.

- Over time, the GIH Council will examine future-related issues. For example, will satellites be part of the I-64 Innovation Corridor's future regional digital infrastructure and intercity connections to other city hub connections? At the moment, terrestrial networks deliver high data rates and satellites expand coverage over broad areas.

  The GIH Council will explore whether a future integrated satellite-terrestrial network architecture will best accomplish the I-64 Innovation Corridor's goal of universal network access, which is fueled by relentless demand for ubiquitous high-capacity connectivity.

> "The Global Internet Hub Strategic Plan is living the promise and power of making connections. This planning effort has pulled together a disparate group of companies, communities, and collaborators from Richmond to Hampton Roads who have laid out a clear vision of what's possible when we work together as one megaregion. Making the Eastern Shore part of this conversation is applaudable and most appreciated. Consideration of the Eastern Shore as a cable landing site, tying into the Eastern Shore's fiber network ring, and serving the assets at Wallops Flight Facility including Rocket Lab is the forward thinking that will make our megaregion a major digital hub."
>
> **Patrick Coady**,
> Founder and former first Executive Director Eastern Shore of Virginia Broadband Authority

5. Attract additional international subsea cables.

The very presence of the subsea cables in Virginia Beach is most responsible for Richmond-Hampton Roads' becoming an emerging part of the world's internet infrastructure. A critically important component of the GIH Strategic Plan is to get into a position to win more cable landings.

Worldwide, the number of subsea cables will exceed 500 by the end of 2023. Over the next 10 years, TeleGeography, the world's expert on inventorying digital assets, estimates that at least 10 to 12 new subsea cables may be built on the East Coast as data transmission demand increases and many of the legacy cables that currently land in New York and South Florida reach the end of their useful 25-year life.

Currently, the Camp Pendleton location in Virginia Beach has three subsea cables in operation serving Europe and South America. There is capacity for a fourth cable to land here. These are three of the fastest, most advanced cables serving the East Coast. The City of Virginia Beach has issued permits to Globalinx to land four cables in the Sandbridge area of Virginia Beach, six miles away from Camp Pendleton.

This supports the global digital infrastructure industry's desire for diverse subsea landing sites.

Globalinx is following the Laguna Beach, California, subsea cable recruitment model at Virginia Beach – speculatively building bore pipes with approved permits out into the ocean in a manner informed by the key decision-makers in the subsea cable ecosystem. According to Globalinx, two of these four speculative cables are in the pre-leasing stage, and the company is preparing to start construction in November 2023. Globalinx reports high interest in the remaining two.

This speculative approach is a proposition that more and more regions will embrace. The real value added is the certainty of access permitting. It is prudent to get the permits and to build the bore pipes and cable landing stations, with the understanding that if it is built, cable operators will come.

> "The global subsea cable market is expanding exponentially. I can attest to the adage 'if we build it, they will come.' My company, Globalinx, is building a new subsea landing site in the Sandbridge area of Virginia Beach. Very soon, two of our four cables landings will be fully leased. Virginia's other landing site is Camp Pendleton and it has room for only one more subsea cable. Virginia needs more landing sites. Ten to 12 new cables will land on the East Coast in the next decade. We have a tremendous opportunity to become the city on the East Coast with the most subsea cables, making us a major player in world of global infrastructure."
>
> **Greg Twitt,**
> CEO
> Globalinx

Myrtle Beach, S.C. is successfully using this strategy. Two cable landing stations (CLS) are planned in Myrtle Beach with a total of nine possible subsea cables. DC BLOX and Globalinx are the holders of the fully permitted diverse sites. Globalinx will have a CLS building with four cables that is slated to be completed in 2024. DC BLOX, which plans to have up to five subsea cables, recently completed its subsea boring into the ocean. Its cable landing station is under construction and is expected to be completed in late 2023. Myrtle Beach officials announced in May that Meta would run a subsea cable from Spain. Google's Firmina cable announced last year that it will connect Myrtle Beach to Argentina, Brazil, and Uruguay. Both cables will connect to the DC BLOX cable landing station.

It's rumored that North Carolina is about to announce the success of a similar approach.

Diversity is key. Laguna Beach's, Sandbridge's, and Myrtle Beach's success confirms that subsea cable investors want to diversify landing sites between regions and within regions.

Virginia has an opportunity to secure more cables over the next decade, becoming the East Coast digital gateway to Europe and South America with the fastest and largest bandwidth capacity on the East Coast. But we must act now to realize this opportunity.

The Global Internet Hub Council will make the acquisition of new cable landings in Virginia a high-priority action item, collaborating with Virginia Beach Economic Development.

Location decisions about subsea cables are made by a relatively small number of individuals (TeleGeography estimates 35 worldwide), and the Council will develop a plan for meeting with these key decision-makers, presenting the case for additional landings here.

The plan will outline the digital assets of the entire I-64 Innovation Corridor and include opportunities for future sites, infrastructure, and how Virginia is protecting subsea cables from anchor-related accidents.

- **Additional Landing Sites:** Subsea cable investors want to diversify landing sites within a hub region. Marseille's success at landing 11 subsea cables in a short period of time has demonstrated the appeal of this approach. Virginia's Eastern Shore may present an opportunity for greater diversification of Virginia's subsea landing sites. The Eastern Shore offers potential sites safe from the shipping lanes. Landing sites could deploy the relatively inexpensive subsea bore pipes strategy. In addition, the subsea cables that land here could utilize the protected conduits running across the Chesapeake Bay Bridge-Tunnel and terminate in a new cable landing station site at the North End of Virginia Beach. This option could also tap into the Eastern Shore of Virginia Broadband Authority's (ESVBA) open-access broadband network ring.

- **Cable Landing Stations:** Part of the diversity that cable operators seek is having not only a diversity of landing points in one region but also the diversity of separate cable landing stations (CLS). CLS are the physical locations where one or more subsea telecommunication cables make landfall and connect to land-based power and networking infrastructure. Currently, Virginia Beach offers one CLS for all cables. The GIH Council will ask Virginia Beach to explore additional arrangements.

- **Cable Safety:** A second part of the case to make to cable investors is how Virginia protects subsea cables from ship anchors. The subsea industry is replete with stories about cables being damaged by large ship anchors. The Virginia Maritime Industry is working with the Coast Guard to develop a subsea cable corridor(s) no-anchorage zone map to protect current and future cables from anchor strikes. The Council will collaborate with stakeholders to get this plan finalized, approved, and promoted, making Virginia subsea cable landings the safest location in the world. The International Cable Protection Committee (ICPC) is a global committee with the primary mandate of the protection of subsea cables.

6. Support the growth of data centers.

Data centers are the engines of a digital economy. Data centers are often the most visible element of a Global Internet Hub. The I-64 Innovation Corridor is highly connected to the world's most important aggregation of data centers, Loudoun County's Data Center Alley, and the facilities in the surrounding NOVA jurisdictions. NOVA has 151 data centers. The I-64 Innovation Corridor has 14 data centers.

The data center industry isn't just a cash cow for local governments. Operators also are good neighbors. The industry wants to use carbon-free energy to power data centers. Meta (Facebook's parent), Microsoft, Google, and Amazon each plan to power 100% of their data centers' long-term operations with some form of carbon-free energy. Data center operators are also active in other ways in the community.

For instance, Meta has contributed to a variety of nonprofits and supports community initiatives in the Richmond region. Since Meta broke ground on its data center in Henrico in

2017, the company has contributed $2.2 million in direct funding to local schools and nonprofit organizations. In June 2023, Meta announced a $300,000 grant to Junior Achievement of Central Virginia. That grant will support the creation of an interactive business “storefront” at the JA Finance Park to advance the program’s goals of personal financial planning and career exploration for 10th graders across the Richmond region.

It should be noted that data centers do not directly employ large numbers of workers. However, data centers create substantial employment opportunities in the construction and servicing of data centers for residents of the regions. For example, Meta has about 200 operational jobs at its data center in Henrico and had 1,500 construction jobs at its peak.

Supporting the growth of data centers is an important component of this plan, but this plan is not just about adding more data centers or data center jobs. It is about creating a critical mass of digital infrastructure to give the I-64 Innovation Corridor an advantage over other regions with faster, more reliable, and less expensive internet for residents and businesses. That, in turn, will make the megaregion more attractive for companies wanting to operate here and create more IT/tech workers with higher-paying jobs.

> “The I-64 corridor, connecting Hampton Roads and the Port of Virginia with Richmond, represents not just a physical artery of commerce, but the digital pulse of our nation's defense. Its role in cementing our global internet connectivity underscores its pivotal significance, ensuring the timely flow of critical information and bolstering our national security infrastructure on the global stage.”
>
> **Tracy Gregorio**,
> CEO
> G2 Ops

It is more than just the people working inside data centers or constructing them. Data centers are a crucial foundational element for regions to be competitive in the modern digital economy. Locations that attract large aggregations of data centers also are likely to be attractive to firms that have similar workforce requirements – IT/tech workers.

A recent study by Mangum Economics found that in Northern Virginia the employment footprint for 10 key occupations within the Data Processing, Hosting and Related Services industry pay wages that are 136% to 236% above the prevailing statewide wage. More importantly, the Mangum Economics study found that these industries cluster together to take advantage of a common workforce pool. According to the study, “The Data Processing, Hosting and Related Services industry is a high paying industry that makes a region more attractive to other high paying industry that must draw from the same highly skilled workforce pool.”

The growing importance of data centers to the contemporary digital economy and the constraints on data center development in highly urbanized areas, such as the availability and cost of land and siting of transmission lines, will necessarily lead to a greater geographic dispersion of data centers. The I-64 Innovation Corridor is well positioned to become an extension of and a complement to NOVA’s worldwide data center market as the East Coast’s digital port to Europe, South America, and beyond.

A recent national report by commercial real estate brokerage CBRE highlighted this potential, noting that the area has seen increased data center activity due to challenges with power and site availability in other markets and that "Richmond is a highly connected and cost-effective location for enterprise and hyperscale customers." A Global Internet Hub in the I-64 Innovation Corridor can help to ensure that the Commonwealth retains its dominance in the data center market and has a unique international position.

The GIH Council will take many steps to capitalize on the attention that has been focused in this direction.

- Establish collaborative relationships with NOVA technology organizations and statewide organizations such as the Virginia Economic Development Partnership (VEDP) and the Virginia Chamber to determine how the megaregion's Global Internet Hub can enhance activity in NOVA to make the Commonwealth even more competitive.

- Support local and regional economic development organizations in inventorying and packaging the viable data center sites in the I-64 Innovation Corridor. Ensure that all options are included such as Naval Air Station Oceana's intention to place 1,000 acres into the public stream of commerce for potential data center development. Getting sites ready includes contracting with engineering firms and working closely with Dominion Energy to formulate infrastructure plans and obtain necessary permits.

- When requested, the GIH Council will help package the Corridor's mega sites as potential Mecklenburg/Microsoft-like data center operations complexes for Amazon and others. Frederick County, Maryland's Q Loop (https://quantumloophole.com/qloop/) can serve as a model for a 21st-century mega-site approach.

- The GIH Council will identify potential barriers to data center development and work with industry leaders, appropriate state agencies, regional organizations, and local government to explore how these can be most effectively addressed.

- The GIH Council will work to repeal the 2035 sunset for state tax incentives for data centers. This tax will come back in 2035 unless it is eliminated.

- The GIH Council will help the I-64 Innovation Corridor jurisdictions understand that incentives come in the form of property tax reduction, sales tax reduction, and discounted power costs with the usage of renewables.

  Across the U.S., 28 of 50 states now provide some form of incentive to attract data centers. Most recently, Rhode Island, Illinois, and Pennsylvania have implemented tax exemption measures to attract data centers to their states.

  In the fiscal year that ended June 30, 2022, Virginia offered $135.9 million in tax deductions to data centers. That was $10 million more than in the previous fiscal year. and $70 million more than in fiscal year 2017. The tax break is set to sunset in 2035 unless reauthorized by the General Assembly.

Prince Edward, Dickenson, Lee, Scott, and other localities in Virginia have actively lowered taxes to attract data centers. The southern region of Virginia is currently using the lowest tax rates to attract data centers from Northern Virginia. Virginia offers a sales and use tax exemption to data centers making a minimum capital investment of $150 million and creating a minimum of 50 new jobs that pay at least 150% of the annual average wage in the locality.

The General Assembly recently passed legislation extending the incentive to data centers in distressed localities (defined as localities with higher-than-average unemployment and poverty rates).

Localities along the I-64 Innovation Corridor, such as Henrico County, Chesterfield County, and Virginia Beach, offer reduced personal property tax rates for data centers and favorable property taxes (only 40 cents per $100 of assessed value, an 89% decrease from the tax rate prior to 2017). Even with the lower tax rate, for instance, revenue generated from data centers has increased by 570% in Henrico since 2017.

> "The interconnectedness of our digital world demands robust and innovative cybersecurity solutions. At Dragonfli Group, we are dedicated to safeguarding businesses and individuals against evolving cyber threats. As we navigate the ever-expanding digital frontier, the Global Internet Hub strategic planning process becomes paramount. It not only ensures a resilient and secure digital infrastructure, but also fosters collaborative efforts to fortify our region and global cyber defense. We are honored to be part of this transformative journey and remain committed to shaping a safer and more secure digital future."
>
> **Glenn Ballard**,
> President and CEO
> Dragonfli Group LLC

Besides continued adjustment of state tax and incentive policies, the I-64 Innovation Corridor will benefit from a coordinated approach to these issues from localities across the megaregion. The GIH Council will address this opportunity.

7. Encourage the growth of IXs and IXPs – Internet Exchanges and Internet Exchange Points.

Internet Exchanges (IXs) and Internet Exchange Points (IXPs), sometimes called a Network Access Point (NAP), are also foundational elements of a Global Internet Hub. IXPs are a "fabric" of ethernet switches within one or more big data centers. They provide a platform for interconnections between networks.

Local networks rely on bigger networks to get to the internet. IXs allow them to minimize this dependence by exchanging free traffic directly with each other. IXs make the process of setting up peering connections much faster. As more networks join the exchange and connect, they see their peering possibilities grow. As members and traffic (eyeballs) build, major carriers, content delivery networks, cloud service providers, and content providers start to join as well, and a thriving local ecosystem builds. More IXPs follow and this, in turn, enables service to previously underserved neighborhoods.

- The Richmond region has an IX (DE-CIX) in Henrico and three IXPs (two in Henrico and one in Hanover). The Hampton Roads region does not have one – yet. It needs one. Several other paths toward the realization of an IX or an IXP in Hampton Roads are presently under consideration and/or development: Globalinx is working toward getting a full IX and IXP at its data center in the Corporate Landing Business Park in Virginia Beach. Point One expects to build a data center in Virginia Beach and it hopes to have an IXP. Other developers are looking to build data centers in the region with possible IXP capability.

- The growth of IXs and IXPs in the region could provide opportunities for the region's colleges and universities to support the development of the I-64 Innovation Corridor's Global Internet Hub. Connecting to an IX could result in better performance of internet traffic for the institutions and give the universities and colleges direct access to the networks connected to the IX. Anytime an IX platform is connected to a region/industry, anyone connected to the platform instantly obtains access to all the networks already on it. A growing number of local student "eyeballs" would attract and encourage content providers and investors to focus on the I-64 Innovation Corridor, fueling the megaregion's digital infrastructure success cycle.

  The GIH Council will work with college and university leadership teams to realize the mutually advantageous opportunities that IXs and IXPs can provide.

> "The Global Internet Hub strategic planning initiative opened everyone's eyes to how much a robust digital infrastructure supports growing cities and regions around the world. The City of Richmond will explore how the GIH Plan's framework could provide our residents and businesses with more cost-effective and reliable broadband service, support our Smart City development goals, generate more high-paying jobs, and ensure that everyone has access to broadband service."
>
> **Sabrina Joy-Hogg,**
> Deputy City Administrator, Finance and Administration
> City of Richmond

8. Explore the potential of an I-64 Innovation Corridor network ring from Hampton Roads to Richmond.

Both international digital infrastructure consultants pointed out that local interconnectivity was a major factor of success in becoming a global interconnection point.

Regions are effectively connected through a competitive mix of carriers with deep fiber access along with backbone services. In some markets, a municipal fiber network ring serves as an additional interconnection access resource. Municipal rings loop around a region, connecting business centers, government centers, universities and colleges, and workforce training facilities. In addition, many bring major trunk line access closer to underserved neighborhoods, affording greater last-mile service by ISPs. Additional benefits of rings are their usefulness in public safety and smart city support.

Five cities in Hampton Roads have invested in a fiber network ring that taps into the subsea cables that will eventually connect 17 localities. A public-private partnership between the Southside Network Authority and Global Technical Systems (GTS), the ring is expected to attract new IXPs, lower prices, and increase speeds for residents and businesses. It is

estimated to cost $107 million when fully constructed — $25 million for the Southside jurisdictions, $45 million for the Peninsula, and $37 million for the outer counties.

Construction is underway on Phase One – the Southside ring. The Global Internet Hub Council should support the buildout of the entire Hampton Roads network ring including on the Peninsula.

Would a similar network ring benefit the Richmond region? Would a hyper-loop-like ring connecting RVA and 757 be helpful in advancing connectivity? Answering these very technical infrastructure questions with precision is beyond the scope of this Strategic Plan. It is envisioned that the GIH Council would explore these questions and refer to the following related considerations in that work:

- Having a high-capacity megaregion fiber ring would provide diversification, which is essential whenever massing data movement.

- A network ring also could offer a unique opportunity to provide clusters of education- and industry-isolated intranets for high-speed computing and security. For instance, the ring could be home to an intranet of cybersecurity training and diagnostic centers completely isolated from the internet. Likewise, medical, education, public safety, and similar specialties could be part of this intranet.

> "Enhancing connectivity only works if it's a win-win for all parties. The GIH Council will strive to advance collaboration and coordination in creating more robust and neutral internet networks and growing the number of Internet Exchanges (IXs) and Internet Exchange Points (IXPs) while keenly appreciating, respecting, and supporting an open and free market economy."
>
> **John W. Martin,**
> President & CEO
> RVA757 Connects

- However, a municipal fiber ring must be determined on a case-by-case basis by the jurisdictions in each market. We encourage Richmond region officials to explore the benefits of one.

- In this exploration, Richmond area officials will no doubt take into account that the region has multiple terrestrial networks with a significant amount of dark (unused) fiber. This dark fiber could be configured and lit up to create a major fiber network ring that connects key assets. This includes municipal-owned and unused networks that could be repurposed for economic development purposes.

- An I-64 Innovation Corridor-long loop holds promise, too. It would be a loop connecting the Virginia state government's digital infrastructure in Richmond with institutions of higher education, NASA's Langley Research Center, Jefferson Lab (with its pursuit to host the Department of Energy's High Performance Data Facility), the Virginia Port Authority, and Rocket Lab on the Eastern Shore. This could also include the high-growth industries of tomorrow — cyber, logistics, data, and life sciences/pharma. Maryland's Quantum Loophole (Q Loop), a 40-mile hyperscale fiber ring linking data center development in Maryland to Ashburn, is an example of the very latest corridor loop ring.

Private companies have installed terrestrial networks with a significant amount of dark (unused) fiber that runs between Hampton Roads and Richmond. This dark fiber could be configured and lit up to create a major fiber network ring that connects key assets of both regions.

The Steering Committee realizes that components of Strategy No. 8 are long-term and even aspirational. Over time, the GIH Council will explore possibilities for expanding and connecting regional and inter-regional networks. We will invite the major carriers (Comcast, Cox, Verizon, etc.) and their trade associations to be part of this conversation.

Any success with industry-wide terrestrial network integration could become one of the keys to real transformation and reinforce the I-64 Innovation Corridor's position as Virginia's digital port and the world's next Global Internet Hub – being carrier-neutral, data center-neutral, and network-neutral.

9. Promote Dominion Energy's ability to provide reliable and inexpensive power and help establish a proactive collaboration between local governments and Dominion to remove potential obstacles to data center development.

Data centers are energy-intensive structures. For every one input of data, five other inputs are produced, relaying the information to other data centers. This requires substantial energy to keep the systems inside data centers running. Data center operators and investors have become increasingly concerned about the availability of reliable power.

Digital infrastructure investors around the world are seeking reliable and relatively less expensive carbon-neutral energy sources.

In Virginia, Dominion Energy delivers on both fronts. Today, 21% of Dominion Energy's output is consumed by data centers. Not only does Dominion have the needed power, it also has the capacity to support digital infrastructure growth along the Corridor and across Virginia for years to come. Finally, Dominion Energy has committed to achieving Net Zero emissions by 2050 and is on track to do so. Since 2005, Dominion has reduced carbon emissions from power generation by 46%. The company's $9.8 billion offshore wind project just off the coast of Virginia Beach is moving forward and the project supports Dominion's commitment.

Recently, there has been some misinformation coming out of NOVA about Dominion Energy's generation capacity. Dominion Energy has the generation capacity. The perceived lack of energy centers on the challenges of building transmission infrastructure in dense urban environments. Dense urban environments such as those in Loudoun County make it difficult to obtain local permitting due to citizen pushback.

In Prince William County, the placement of data centers adjacent to some residential areas has generated a wave of citizen pushback and is now shaping hotly competitive local electoral contests.

The misinformation on Dominion and the pushback on data centers has played into the dynamic nature of the digital infrastructure market, accelerating the shift of data centers from high-density large city locations to mid-size markets.

The GIH Council will take several steps to advance this opportunity for the I-64 Innovation Corridor.

- The Global Internet Hub Council will share the real story of Dominion's energy capacity to help support NOVA while positioning the I-64 Innovation Corridor as the optimal place to expand data center presence in Virginia.

  Available land is both more plentiful and far less expensive in the megaregion than it is in NOVA. Plus, the challenges of building new transmission lines and siting data centers are likely to be far less severe in an environment that has more available land and that is not entirely urbanized even in several of its more populous counties.

- Work with Dominion Energy to map the most viable data center sites in the I-64 Innovation Corridor. Incorporate these insights into other site development materials detailed in this document.

- As mentioned under potential data center site support (strategy No. 6), begin upfront work with the localities where potential sites are located to acquire permits for designated locations and to identify and address possible obstacles to permitting.

10. Provide a growing tech-savvy workforce.

A robust digital infrastructure requires and builds a growing tech talent pool.

The Bureau of Labor Statistics projections consistently indicate that jobs in digital infrastructure will both be in high demand and will pay above-average wages for the next decade.

It has become recognized that building a tech talent pipeline that begins long before college and extends through post-graduate education is crucial for regions that want to compete successfully in the emergent digital economy. This is why GO Virginia has made support for regional talent pipelines a prominent emphasis in its funding decisions.

The I-64 Innovation Corridor presently has a wealth of technical certifications, badges, and degrees in tech-related jobs and several new initiatives intend to increase coordination among institutions and improve the effectiveness of the partnerships between educational institutions and industry on workforce development. A small sampling includes:

- Programs such as CodeVA and GO-TEC bring computer science education to K-12 schools as part of an effort to acquaint students at an early age with the range of opportunities available in the digital economy and the skills that will enable them to be successful.

- The considerable number of partnerships between industry and community colleges that focus on work-based learning opportunities, enabling students to obtain credentials that make them job-ready upon completion. The megaregion's two workforce council boards (Capital Region Workforce Development Board and the Hampton Roads Workforce Council) also have industry-based partnerships with work-based learning such as paid internships, on-the-job training, and incumbent worker training.

- Virginia Commonwealth University's four-course program in digital technology for non-engineering majors that is offered currently by the Greater Washington Partnership to address the shortage of tech-credentialed workers in the region.

- The Virginia Business Higher Education Council's Growth4VA agenda calls upon the colleges and the business community to make paid internships and work-based learning opportunities available to all students who want one.

- Old Dominion University offers multiple degrees that focus on cybersecurity.

- William & Mary is creating a cybersecurity program that will partner with other colleges and universities.

- The Commonwealth Cyber Initiative (CCI) is Virginia's main access point for cybersecurity research, innovation, workforce development, and news. CCI is a network of industry, higher education, and economic development partners across Virginia including VCU, ODU, Virginia Tech, Virginia Union University, and Norfolk State University.

> "From colleges and universities to community colleges to workforce councils, the entire workforce ecosystem plays a role in supporting digital infrastructure growth and increasing Virginia's data and tech talent pipeline. William & Mary is playing its part, advancing data science and computer science programs, developing new cybersecurity activities, and pursuing partnerships with other local institutions to help our region grow. The work of the Global Internet Hub Plan will accelerate our academic collaboration and help deliver the needed workforce for tomorrow."
>
> **Anthony Stefanidis**,
> Professor and Director of Data Science
> William & Mary

The Steering Committee recommends that the Global Internet Hub Council's strategy to support the growth of the regional tech talent pipeline follows a two-phased approach.

- During the Council's first year of operation, work to ensure that existing talent pipeline programs – badges, certifications, and degree programs offered in workforce training, public and private schools, community colleges, four-year colleges and universities, and other educational providers are understood by the digital infrastructure ecosystem

organizations and businesses to help maximize their use. Inventory all programs and share this resource with all partners.

- In the second year of the Council's operation, assess the needs of companies in the digital infrastructure ecosystem for both tech talent and its necessary support services. Ensure that the digital infrastructure ecosystem's talent needs are being met, for both tech talent and necessary support services. In addition, map the anticipated future talent needs of the digital infrastructure ecosystem. Share this assessment with all related program providers. This work may inspire a future GO Virginia grant, tailoring the successful work-based learning programs that GO Virginia has supported in advanced manufacturing and pharmaceuticals to the digital infrastructure being created in the I-64 Innovation Corridor.

- Through both phases, ensure that the Steering Committee's goal of inclusion and equity is an integral feature of workforce talent development efforts, collaborating with Historically Black Colleges and Universities (HBCUs), community colleges with large minority enrollments, K-12 schools in underserved communities, and Virginia Career Works networks and centers to develop tech talent.

Combined Power of the 10 Strategies

The Steering Committee has identified these 10 strategies as what it will take to make the I-64 Innovation Corridor one of the world's recognized Global Internet Hubs.

It is critically important to understand that not one of these 10 recommendations is the silver bullet strategy. It will take the combined success across all of these initiatives to make a meaningful difference.

For example, as stated earlier, supporting the growth of data centers is an important component of this plan, but this plan is not just about adding more data centers. It is about creating a critical mass of digital infrastructure to give the I-64 Innovation Corridor an advantage over other regions with faster, more reliable, and less expensive internet for residents and businesses. That, in turn, will make the megaregion more attractive for companies wanting to operate here and create more IT/tech workers with higher-paying jobs.

V. Funding Resources

The Steering Committee identified several funding sources for this Strategic Plan to jump-start the creation of the I-64 Innovation Corridor's Global Internet Hub.

- **Organizational Support –** Lead corporate investors, including organizations that served on the Steering Committee, will fund the Global Internet Hub Council's initial work.

  Over time, additional organizational support funding will come from membership dues, events, and sponsorships. The Hampton Roads Community Foundation is entertaining a

significant three-year grant to support the work of the Global Internet Hub Council as part of RVA757 Connects.

This organizational funding will support:

- Operational management of the Global Internet Hub Council;
- Outreach and education of local stakeholders within the I-64 Innovation Corridor;
- Outreach and education of global digital infrastructure investors;
- Organizing grant requests;
- Work with economic development partners in approaching subsea cable investors; and
- Work on advancing the regional tech talent pipeline.

- **Digital Infrastructure –** The Steering Committee views digital infrastructure expansion from both a short and long-term perspective.

  Short-term, attracting additional subsea cables to Virginia and data centers to both regions are top priorities and are both relatively inexpensive. It is anticipated that initial funding for short-term initiatives will come from GO Virginia and the General Assembly.

  Long-term, the expansion and addition of regional and interregional networks and adding IXPs will require significant investment and will take a great degree of planning and local support.

  RVA757 Connects is in conversation with GO Virginia to apply for a joint Region 4 (Richmond) and Region 5 (Hampton Roads) grant to fund the preparation of data center sites. The grant will include local, regional, and state economic development agencies in creating an inventory of fully permitted Tier 4 or Tier 5 data center sites in the Richmond and Hampton Roads regions. If awarded, engineering firms would help the Global Internet Hub Council implement this work.

  The Steering Committee will also approach the Administration, the Virginia Economic Development Partnership, and regional and local economic development agencies to develop an aggressive game plan with related incentives to recruit subsea cable investors. This work could inform specific funding needs from the upcoming state biennial budget.

  Again, TeleGeography estimates that 10 to 12 new subsea cables will come ashore on the East Coast in the next 10 years. Committee members believe that attracting more subsea cables and the super-regional data facilities they serve will propel the I-64 Innovation Corridor and the Commonwealth forward and should be viewed in the same way and have the same kind of benefits that investing in the Port of Virginia has brought in the first quarter of the century.

  Long-term infrastructure funding for fully completing the Hampton Roads network ring and making similar investments in a Richmond-Hampton Roads loop or a Richmond fiber network ring will be explored working with local officials, carriers, and other network leaders.

VI. Summary:

The establishment of RVA757 Connects has provided the organizational framework that has enabled leaders in the business, nonprofit, educational, and governmental communities in both the Richmond area and Hampton Roads region to see the benefits of collaboration across the megaregion.

The creation of a Global Internet Hub will take this collaboration in an even more powerful direction, creating economic and community benefits across the I-64 Innovation Corridor that could not be accomplished by Richmond or Hampton Roads alone.

This bold plan – a once-in-a-generation opportunity – will transform the Steering Committee into an ongoing Global Internet Hub Industry Council that will oversee the successful implementation of this plan. The work of the Council will ensure that terrestrial networks will be robust as possible, network rings will be designed and installed, an Internet Exchange will arrive in Hampton Roads, more subsea cables will land in Virginia, and international investment in our digital infrastructure will continue to rise.

All of these strategies together will create the critical infrastructure to give the I-64 Innovation Corridor an advantage over other regions. These strategies, working in tandem, will create the digital infrastructure that will in turn attract high-paying IT/tech jobs.

The Steering Committee believes that the realization of becoming a Global Internet Hub will likely do more to advance Richmond's and Hampton Roads' economies in the first half of the 21st century than building Interstate 64 did for both regions in the second half of the 20th century.

Now is the time to think big, act boldly, and embrace urgency!

VII. Steering Committee

More than 60 leaders from 10 different industry and business categories are members of the Global Internet Hub Steering Committee. (The content of this report does not necessarily reflect the views of the Steering Committee members' companies or organizations):

Brian Anderson, President and CEO, ChamberRVA

Shawn Avery, President and CEO, Hampton Roads Workforce Council

Glenn Ballard, President and CEO, Dragonfli Group, LLC

Antoine Banks, Virginia Lead of Government and Regulatory Affairs, Comcast

Serena Barry, Communications Director,

GROW Capital Jobs Foundation/ GO Virginia Region 4

Charles J. Bauman III, Business Development Coordinator, City of Virginia Beach

Capt. Lamont Bazemore, Coast Guard District Five, Chief of Planning and Force Readiness

Stan Blackwell, Director, Customer Service and Strategic Partnerships, Dominion Energy

Gerardo Bonilla, Head of Sales, Telxius

Keith Boswell, President and CEO, Virginia Gateway Region

Scott Brown, Owner, Pixel Factory Data Center

Lt. Luis Caquias, Coast Guard District Five, C5I and Security

Patrick Coady, Former Executive Director, Eastern Shore of Virginia Broadband Authority

Katie Comer, Community Development, Meta

Marcia Conston, President, Tidewater Community College

Bob Crum, Executive Director, Hampton Roads Planning District Commission

Stephen Cummings, Virginia Secretary of Finance

Ben Davenport, Business Development Director, GTS

Brian Davis, Director, Capital Region Workforce Partnership (CRWP)

Steven DeBerry, Executive Director, Southside Network Authority

Tad Deriso, President and CEO, Mid-Atlantic Broadband Communities Corporation

Rick Dwyer, Executive Director, Hampton Roads Military
and Federal Facilities Alliance (HRMFFA)

John Ferrel, Business Development Director, Cloud & Network Services, QTS

Morris Foster, Vice President of Research, Old Dominion University

Nancy Grden, President and CEO, Hampton Roads Executive Roundtable

Tracy Gregorio, CEO, G2 Ops

Ram B. Gupta, Associate Dean for Research and Graduate Affairs, College of Engineering, Virginia Commonwealth University

David Harold, Director, Technology Operations, CarMax

Steve Harrison, Vice President, Business Intelligence and Communications, Hampton Roads Alliance

Stephen Hartka, Vice President of Research, Virginia Economic Development Partnership

Martha Heeter, Executive Director, PlanRVA

Stuart Henderson, Director, Jefferson Lab

Robert Holsworth, Managing Partner, DecideSmart

Sabrina B. Joy-Hogg, Deputy City Administrator, Finance and Administration, City of Richmond

Michael S. Karafotis, Managing Director, Data Quality and Control Executive, Global Technology and Operations, Bank of America

Mark Klett, CEO, Klett Consulting

Hakim J. Lucas, President, Virginia Union University

Maj. Chad Martin, Joint Base Langley-Eustis, 633rd Communications Squadron, Director of Operations

John W. Martin, President and CEO, RVA757 Connects

Kelley McCall, Community Development Regional Manager, Meta

Bob McKenna, President and CEO, Virginia Peninsula Chamber

Matt McLaren, Senior Project Manager, Chesterfield County Economic Development

Vinay Nagpal, President, InterGlobix LLC

Kelly Newman, General Manager, PointOne

Angela Oakes, Vice President of Strategy, Greater Richmond Partnership

Joel Ogren, CEO, Assured Communications Advisors

Paula P. Pando, President, Reynolds Community College

Mark Pike, former Navy Region Mid-Atlantic Chief Information Officer/N6

Bernard Robinson, President and CEO, Networking Technologies + Support

Anthony Romanello, Executive Director, Henrico Economic Development Authority

Katherine Rowe, President, William & Mary

Leonard Sledge, Economic Development Director, City of Richmond

Douglas L. Smith, President and CEO, Hampton Roads Alliance

James Spore, Board of Directors, RVA757 Connects

Anthony Stefanidis, Professor and Director of Data Science, William & Mary

Bryan Stephens, President and CEO, Hampton Roads Chamber

Gary Tarpley, CEO, Metro Fiber Networks Inc.

Jeffrey Thomas, Vice President and Chief Technology Officer, Sentara

Greg Twitt, CEO, Globalinx

Jennifer Wakefield, President and CEO, Greater Richmond Partnership

Pedro ”Peter” Wallace, Chief Information Officer, City of Virginia Beach

David White, Executive Director, Virginia Maritime Association

Laura White, Chief Risk Officer, PRA Group

Raymond White, retired Business Development Coordinator, City of Virginia Beach