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REQUEST TO ESTABLISH THE REGIONAL TECHNOLOGY READINESS INSTITUTE

Technology plays an essential role in our lives and is critical for, among other things, the delivery of healthcare, education and financial services. It is inextricably tied to the achievement of higher education's core mission – education, research and service.

UNCG has an unprecedented opportunity to play a pivotal role in engaging the region to establish sustainable, community-accessible cyberinfrastructure by establishing the Regional Technology Readiness Institute (RTRI). When established, the RTRI will operate as a public service institute that will leverage UNCG's collaborative partnerships and cyberinfrastructure to build, manage, maintain, drive and collectively grow shared regional technology and data architecture that will connect educational institutions, municipalities, community organizations, industry partners and people in our twelve county Piedmont Triad region.

CHALLENGE

Technology development has evolved to the point where it is no longer cost effective for entities to invest in sole-use technology infrastructure. This necessitates bold and cooperative thinking about how to provide access to technology at an economy of scale. Moreover, the era of working as individuals within a global, "smart and connected" society necessitates access to data and data management technology *for everyone*. Coupled with expertise and services to promote broad utilization by the community and adoption of the technology into research, educational and industry applications, the return on the investment in such technology can be enormous.

MISSION

Transform the Piedmont Triad into a "smart and connected" region where communities and innovation thrive through shared technology and data.

VISION

Make a state of the art technology infrastructure backbone accessible to the region's K-12 and higher education institutions, municipalities, community organizations and industry partners and create regional centers of excellence for cyberinfrastructure, data and smart cities that catalyze collaborative research, innovation and workforce development.

BENEFITS

Establishing the RTRI connects directly with the three areas of transformation defined in the UNCG strategic plan.

The RTRI will drive *student transformation* by improving technology readiness and capacity at all K-12 schools and anchor institutions, including UNCG, in the region by:

- ensuring that all institutions, including those serving low-income, rural and urban constituencies, have access to technology infrastructure that allows educators access to state-of-the-art educational and classroom management tools and solutions,
- working collaboratively with our partners in the schools to jointly develop curriculum that includes access to, and the utilization of, technology to better prepare students for post-secondary success and to improve every student's chances of earning a college degree,
- creating professional development pathways for educators to become "technology-ready" and confident about how to utilize the technology to transform the learning experience for their students and
- creating a sustainable infrastructure to support the number of growing data analytic and informatic initiatives at UNCG.

The RTRI will catalyze *knowledge transformation* by:

- providing access to world-class cloud computing resources and big data management architecture that will drive projected exponential growth in data science research and scholarship,
- signaling regional readiness to support large-scale, convergence research initiatives from which the discovery and innovation needed to solve complex and vexing societal problems will emerge and
- making individual and multi-institutional grant applications more competitive by having this infrastructure and being able to document established and sustained key partnerships whether local, regional, state, federal, private or industry

The RTRI will promote *regional transformation* by:

- enabling sustainable growth in the region's data science, analytics, engineering and translation capacity by providing educational workforce development opportunities focused on high speed networking, cyber and information security, use of cloud-based computing systems, enterprise application platforms, and data science training systems and
- ensuring that the next generation infrastructure (technology and tools) is in place to connect UNCG and the region to the emerging global computing and data platforms upon which modern industry is being built and provide students and researchers with cutting edge opportunities to experience and develop the technology integrations of the future.

Establishment of the RTRI signals regional readiness to support large-scale, convergence research initiatives. Convergence research, as defined by the National Science Foundation (NSF), is a means of solving vexing research problems that are complex and often driven by societal need. Convergence research entails integrating knowledge, methods, and expertise from different disciplines, sources, and communities and the formation of novel frameworks that catalyze scientific discovery and innovation.

The RTRI will uniquely serve the region's convergence research efforts by providing the technical foundation to enable **Big Data management**: systematic extraction and combination of large volume and disparate data sets (structured and unstructured data), permissioned access, storage and dissemination; **Big Data discovery**: support of large scale data transformation using sophisticated analysis protocols that include deep machine learning and the application of

artificial intelligence methodology; and **Big Data innovation:** development of virtual database technology and an Open, FAIR, data governance framework.

The RTRI resources and data science and analytics framework will enable convergence service, resource allocation, educational and economic development initiatives as well as support the growing number of data analytic and informatics efforts currently underway at UNCG. The RTRI will provide a state-of-the-art technology architecture platform upon which technology infrastructure-use models can be applied, developed and tested. At the outset these models will break down the technical barriers that can inhibit the effective use of these resources, facilitate collaboration, and become the bridge to connect the region.

Last, working collaboratively to build shared technology infrastructure enhances all of the partner institutions' information technology capacity and readiness by building long term sustainable models for operational optimization and growth through economies of scale.

CREATING A NEW MODEL

The Institute will house common, extensible state-of-the-art technology infrastructure built upon a world-class cloud computing backbone and big data management architecture. The Institute will harness the burgeoning economy of scale to ensure technology readiness and capacity across all twelve counties of the Piedmont Triad region of NC.

UNCG has the technical resources to play the lead role in designing and establishing the backbone infrastructure framework to seed the RTRI, but building, sustaining and growing the resource will be a fully cooperative endeavor that will depend on a diverse set of stakeholders. The scale of the RTRI is beyond that of a single existing institution or University structure. Success will depend at the outset on 1) the full engagement, partnership and support of the education, municipal, community and industry Chief Information Officers and their relevant technical staff in the target counties, and 2) generating investment funding and resources from major technology vendor-partners and other sources (gifts, grants).

Neither UNCG nor any of the institutions within the UNC System have existing structures with a similar “regional technology readiness” vision, mission and projected footprint. The Regional Technology Readiness Institute will be unique in North Carolina. The RTRI will be a new “American model” for the critical role R2 universities must play in unifying their communities to *innovatively and intentionally* catalyze regional engagement, respond to university and community needs, and establish a fertile environment where high impact work force development and cutting-edge research prospers.

OBJECTIVES

Establish stakeholder advisory boards and sustainable management frameworks for centers of excellence:

- Cyberinfrastructure,
- Piedmont Regional Data Collaborative and
- Smart Cities (IoT)

Secure funding:

- Vendor-partners' commitments,
- Grant, contract and donor funding and

- Establish mechanisms, aligned with the business plan, to sustain and grow the technology infrastructure assets and services

Establish regional technology, data and service cores:

- Design and implementation of a shared cloud computing architecture that is scalable to the educational, municipal, and business entities in the 12-county Piedmont region
 - pilot the architecture by migrating the UNCG, City of Greensboro, and Guilford County Schools data centers to the shared cloud compute infrastructure,
 - migrate additional Guilford County partners to the proven architecture model and
 - extend the model to other Piedmont communities.
- Pool fiber assets and drive vendor supported “last mile” new fiber construction to create high speed internet connectivity paths to all Guilford County K-12 schools, Greensboro Housing Authority neighborhoods, community centers, libraries and community anchor institutions
 - ensure that low-income underserved areas within our community have equal access to Internet connectivity,
 - extend the shared fiber resource model to other Piedmont communities and
 - identify risks and opportunities to the regional fiber infrastructure.
- Build a regional open data collaborative that provides the secure data lake infrastructure, administration and governance required to store and provide access to regional open data
 - establish the Piedmont Regional Data Collaborative (PRDC) as a center under the RTRI that serves as the local data intermediary for the Piedmont region,
 - work in partnership with the Forward Guilford Community Indicators Steering Committee to identify and ingest all relevant data sets across Guilford County into the PRDC data lake and
 - facilitate business intelligence analytics research initiatives that leverage the regional data lake to solve community problems, enable more transparent government, and improve quality of life.

ADVISORY BOARDS

The work of the RTRI in each area of excellence will be guided by robust advisory boards comprised of key stakeholder subject matter experts across a broad swath of University, Municipal, School District, Civic and Industry regional leadership.

STRUCTURE AND LEADERSHIP

The RTRI will be managed by the Institute Director in partnership with the Institute Chief Technology Officer. RTRI administration will be managed by the UNCG Vice Chancellors for Research and Engagement and Information Technology Services.

SUMMARY

The RTRI is a unique model that will launch with already established strong community partnerships and support to directly address both UNCG’s core mission and strategic objectives, as well as the urgent problems we face in our community and region. The RTRI will transform the Piedmont Triad into a “smart and connected” region where communities and innovation thrive through shared technology and data.