STRENGTHENING THEE RESEARCH & EDUCATION CYBERINFRASTRUCTURE IN ORDER TO ACHIEVE AN R1 RESEARCH DESIGNATION

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Introduction

Background:

- JSU's Goal: Achieve an R1 research designation through strengthening its cyberinfrastructure.
- National Context: Emphasize the importance of cyberinfrastructure in achieving research excellence and promoting diversity in STEM.
- HBCU Role: JSU, as a leading HBCU, plays a pivotal role in closing the representation gap in STEM and improving access to research resources.

Purpose

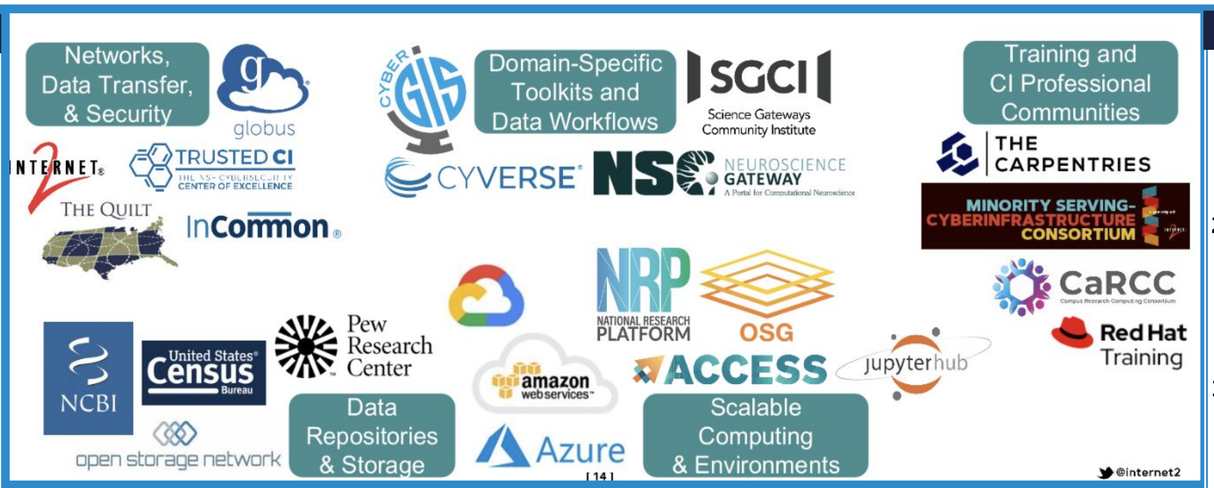
- The purpose of this study is to develop and enhance JSU's research and education cyberinfrastructure to support high-level research, facilitate interdisciplinary collaboration, and position JSU as a leader in R1-level research.

Hypotheses

- Hypothesis 1: Strengthening JSU's cyberinfrastructure will increase interdisciplinary research output across departments.
- Hypothesis 2: By leveraging thematic research clusters and aligning resources around science drivers JSU will streamline research collaboration and enhance its ability to secure external research funding and resources.
- Hypothesis 3: Enhancing JSU's research infrastructure will significantly increase its contribution to national diversity in STEM by providing greater opportunities for underrepresented groups.

NSF/Internet 2/JSU Collaboration

NSF Proof of Concept Grant: A grant from the National Science Foundation aimed at improving cyberinfrastructure.
Purpose: Supports minority-serving institutions in building research capacity, especially in STEM fields.
Focus: Enhances computing power, data storage, and networking to foster interdisciplinary collaboration.
Goal: Increase participation of underrepresented groups in national STEM research.
Expected Outcome: Helps institutions like JSU move towards R1 status and engage in larger research initiatives.



CSET Clusters Examples

SUSTAINABLE ENGINEERING

Dr. H (Environmental Chemistry & Toxicology)
Dr. L (Environmental Engineering)
Dr. G (Environmental Science)

Resource Needs: Data storage, large-scale data analysis tools

HEALTH SCIENCES & BIOTECH

Dr. F (Immunology & Molecular Biology)
Dr. P (Molecular Toxicology)
Dr. I (Cellular & Molecular Biology)

Resource Needs: genomic data storage, high-performance computing, lab space

AI & DATA SCIENCE

Dr. A (Electrical Engineering)
Dr. M(Computer Science)
Dr. T (Computational Fluid Dynamics)

Resource Needs: HPC resources, storage for large datasets, advanced algorithms

Computer Science Researcher Info Card Examples

RESEARCHER 1

- **Position:**Faculty, Computer Science Department
- **Focus:** HPC for environmental simulations & AI integration for climate prediction
- **Needs:** HPC access for simulations, data storage for climate models
- **Available Resources:** Expertise in environmental data analysis, AI tools for predictive modeling.

RESEARCHER 2

- **Position:**Student, Computer Science Department
- **Focus:** Data science for bioinformatics and software development for computational biology
- **Needs:** Access to lab equipment, mentorship for data analysis
- **Available Resources:** Experience in Python for bioinformatics, knowledge in data entry and sample collection

AI | SUSTAINABILITY | DATA SCIENCE | BIOTECHNOLOGY | DATA SCIENCE

REFERENCES

1. National Science Foundation (NSF). National Strategic Overview for Research and Development Infrastructure. Available at: https://www.nsf.gov
2. Jackson State University. College of Science, Engineering, and Technology Faculty Information. Available at: https://www.jsums.edu/cset2/

Process

1) **Stakeholder Identification:**
   - Identify stakeholders who will benefit from or contribute to JSU's cyberinfrastructure.
   - Engage with researchers, students, and faculty to understand research needs, goals, and advancements.
2) **Cluster Creation using LucidSparks:**
   - Use LucidSparks to create thematic clusters across departments.
   - Categorize researchers by shared interests, interdisciplinary opportunities, and needs.
3) **Infrastructure Analysis:**
   - Access current HPC, HTC, networking and data capacities.
   - Identify opportunities for expansion in line with demands.
4) **Collaboration:**
   - Foster collaboration both internally (across departments) and externally (with HBCUs like Alcorn State, and Mississippi Valley State).
   - Share resources and expertise to maximize the impact of cyberinfrastructure investments.
5) **Resource Alignment:**
   - Align infrastructure investments around science drivers identified through thematic clusters.
   - Ensure that technology resources are directed toward areas with the greatest potential for interdisciplinary collaboration and impact.

Implications

- **Boosting Research and Education:** Improving JSU's cyberinfrastructure will strengthen its research capabilities, helping the university achieve R1 status and lead in national STEM efforts.
- **Encouraging Collaboration:** The creation of research clusters will make it easier for faculty and students to collaborate across departments, sharing resources and ideas for better research outcomes.
- **Providing Better Research Tools:** Upgraded computing and data storage systems will give JSU researchers the tools they need to conduct advanced research and compete for more funding.
- **Promoting Diversity in STEM:** The improved infrastructure will increase access for underrepresented groups, helping to close the diversity gap in STEM by offering equitable research opportunities.
- **Expanding Regional and National Impact:** JSU's enhanced infrastructure will foster collaborations with other HBCUs and contribute to research addressing key issues like healthcare disparities and environmental challenges.