Networking Infrastructure for the Great Plains Region

Executive Summary

Continued ***expansion*** of the regional Information Technology sector, with collateral benefits to the region's research, education and economy, ***depends heavily*** on the ability to ***upgrade the supporting networking and computing infrastructure***. Studies conducted from North Carolina to California indicate significant increases in productivity, income, and job creation resulting from fiber-optic networking and grid computing. In a study commissioned for the State of **Texas** leading to a **$10 million commitment** of funds for advanced R&E networking infrastructure, Weinstein & Clower (2004) conclude that

> To remain competitive in the quest for research dollars, as well as new industry, Texas must develop the infrastructure to support "grid computing," a distributed network where there is no longer a mainframe or centralized computer. Connected by high-speed fiber optics, the grid provides enhanced computer power to individual researchers and projects. Many states, including Ohio, North Carolina, Indiana and Virginia, have already recognized the potential of grid computing—not only to assist researchers at universities and corporate R&D shops but also as a stimulus to economic development and job creation—and they are investing public dollars to acquire dark fiber and web service software. What's more, these states have initiated programs to connect their state networks to two emerging national grids—National LambdaRail and TeraGrid.

The National Association of State Universities and Land-Grant Colleges (NASALGC) estimates a 5 to 1 return on research investment. NASALGC also estimates that for every new job created on campus, 1.6 new jobs are created in the community. A ***conservative*** estimate is that a **$25 million investment** in advanced networking infrastructure will increase ***federal R&D funding*** to the region by 10%, resulting in a net increase of personal income in the amount of **$72 million** and the creation of over **1800 new jobs**.

Research areas that will immediately benefit from high-speed optical networking and grid computing include

- high performance physics,
- bioinformatics,
- engineering
- nanotechnology,
- geosciences and spatial modeling,
- computational chemistry, and
- climate modeling.

Impact on the ***private sector*** will be substantial as new patents are filed, new inventions are licensed, new businesses are created and new technologies are transferred. The Texas investment of $10 million is expected to result in a **net gain of more than 21,000 jobs paying $486 million in annual wages and salaries**. ***Industries*** that will benefit include

- agribusiness
- oil and gas production,
- bioscience,
- education,
- aerospace,
- manufacturing, and
- financial services.

Expecting a substantial economic return on investment, the State of **Louisiana** has recently announced a commitment **$25 million** towards the Louisiana Optical Network Initiative (LONI) to optically interconnect Louisiana universities to the National LambdaRail and the National Science Foundation's TeraGrid.

While new national initiatives can bring great opportunity, new national initiatives can bring great challenges for the Great Plains Network (GPN) region (Arkansas, Iowa, Kansas, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota). Failure to remain competitive by developing a high-speed optical network to enable grid computing in the GPN region threatens to put businesses at a competitive disadvantage, to diminish our ability to grow and attract new industry, and to jeopardize our colleges and universities by causing great difficulty in recruiting and retaining superior faculty and students. The consequences of failure are not, merely, to remain in place, but to lose our position and fall even further behind. In the past, member states have been able to successfully partner to achieve a community solution.

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