Planning Grant I/UCRC: Net-Centric Software and Systems Center

Net-centric computing is based on the principle of a distributed environment where applications and data are downloaded from servers and exchanged with peers across a network on an as-needed basis. Instead of viewing applications as having a fixed set of capabilities one can think of a set of highly reliable services that are dynamically created from acquired services, then verified and validated in the field in real-time. Since these applications will be made available over network communication, the development of net-centric software demands high-levels of security, dependability, and real-time response. There is an urgent need in industry for research and development to restructure software design and execution and system implementations for networked and cloud computing environments. The objective of this proposal is to create a Purdue University site to the already established Texas-based Net-Centric Industry-University Collaborative Center funded by NSF. The industry-university collaboration in net-centric computing will lead to transformative research, prototypes, experiments, measurements, and technology transfer from university to industry. Purdue faculty will bring diverse expertise in net-centric and cloud computing areas, including service oriented architecture, security and adaptability in mobile computing, data-centric computing beyond parallelism, reliable distributed data storage, information flow tracking and auditing.

Intellectual Merit:
The Net-Centric Software and Systems Center at Purdue University will pursue fundamental engineering and scientific research with high relevance to net-centric systems in industry. The research performed at the center will focus on the design, implementation and deployment of highly reliable and secure software and systems in net-centric and cloud environments. The key merits of the research to result from this establishment will be:

- Advancing real-time mobile-cloud centric computing:
- Improving performance of real-time analysis of big data and data-centric computing:
- Enhancing privacy and security in net-centric computing:
- Realizing information flow tracking and auditing in net-centric environments:

Broader Impacts: The establishment of the Net-Centric Software and Systems Center at Purdue will accelerate and promote the transfer of knowledge and technology to industry. It will provide feedback from industry for enhancing courses and research of both undergraduate and graduate students. It will better prepare students for team projects and as an intern or employee for industry. The courses to be designed and enhanced as a result of the center activity will have a great impact on the education of science and engineering students, producing graduates who have a broad, industry-oriented perspective of their research and practice. Several Ph.D. and Master's students including those from underrepresented groups will gain significant industry type experience from the research projects undertaken by the faculty members from various universities of the center. Students will be able to interact with faculty, students and industry partners from other center sites. Dissemination of the research results through publications at conferences and journals as well as special seminars to be organized by the PI and collaborators will allow for increased awareness of the problems faced by industry in net-centric computing and advance the Computer Science and engineering.