

The Notre Dame Center for Research Computing (CRC) is a unique, interdisciplinary environment, where computational scientists, HPC and network engineers, and research programmers work side-by-side with scientists, engineers, mathematicians and scholars in the arts, humanities and business to create new information technology approaches to research.

focus on Research Software Development

With an abundance of data, new technology and increasing demand for knowledge and experience sharing, research without software is becoming increasingly difficult. The CRC has extensive experience in software development and performance profiling with numerous engineers and professional programmers on staff. The CRC is the perfect partner with broad software development expertise and extensive experience managing research and development projects of all different scales.



Stable, sustainable support

The CRC provides a stable home for software development skills, one which does not experience the same cyclical turnover as academic labs staffed with students and postdocs. We advocate for sustainable practices, and help researchers build more reliable, efficient code that can be more easily shared and reused.

Flexible approach

Embracing agile software development principles, the CRC can configure a team to a project of any complexity. Emphasis on good software engineering practices, technical excellence and delivering working software early in the process, are key components of a more disciplined and flexible approach to software development.

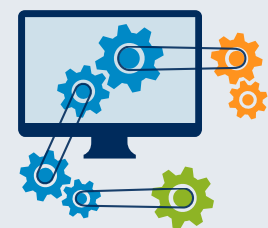


Broad range

Believing there is no project too big or too small, the CRC can build anything from prototypes and proofs of concept to end-to-end solutions. We develop software, web portals, novel cyberinfrastructure, and mobile apps. We are here to collaborate, not just provide work for hire, so we partner with researchers on projects and proposal development.

Security-minded

Cybersecurity is a foremost concern for the CRC. To empower our development process while simultaneously reducing project risk, we use a workflow that maps onto both the National Institute of Standards and Technology (NIST) System Development Life Cycle and the NIST Risk Management Framework. According to the specific needs of projects, we then apply NIST policies, procedures, and controls to ensure compliance with FISMA, HIPAA, etc.



Testing and Evaluation

The CRC offers testing and performance evaluation of third party software and computer systems, including all physical components and the full software stack. Anything in the data path, software or hardware including distributed environments, is included, as it can affect performance. Third party evaluation and performance analysis helps eliminate potential bias.

focus on Services and Resources

Computational resources: 30,000+ CPU cores in systems of various architectures, typically oriented towards HPC batch job submission

Storage resources: approximately 3 petabytes of data storage, including disk-based systems for high performance and user data storage, and tape-based systems for long term storage

Specialized resources: visualization systems, systems for virtual hosting, prototype architectures, high throughput computing infrastructure, and networks

Access and interface to national infrastructures such as XSEDE, Open Science Grid, Blue Waters, and Internet2

Access and interface to public cloud infrastructures, such as AWS, Google Cloud, Microsoft Azure, Rackspace's OpenStack

FISMA moderate level of data and information systems security

Data analytics training lab

Restricted data room with air gapped systems for storage and analysis of highly sensitive human subjects' data

Expertise

HPC system engineers

Research programmers

Data science consultants/technologists

Geographic Information Systems (GIS) specialists

Visualization specialists

Computational scientists with expertise in:


Applied Mathematics	Decision Support Systems
Cloud Computing	Design Optimization
Computational Chemistry and Chemical Engineering	High Performance and High Throughput Computing
Computational Fluid Dynamics	Molecular Dynamics
Computational Genomics	Operations Research
Computer Networks	Quantum Computing
Computer Science	Research Data Management
Cybersecurity	Science Gateways
Data-Intensive Computing	Semantic Data Integration and Open Linked Data
Data Analytics	Software Defined Networks
Data/Software Preservation	





focus on Facilities



The CRC operates a supercomputing infrastructure providing advanced computing support to researchers and teachers within Notre Dame and external organizations. The ND CRC data center is operated according to industry standards and allows for flexible growth in physical footprint and utility demands. The Global Access Point Union Station facility is located at 310 W South Street, South Bend, IN near the Notre Dame main campus. ND CRC system engineers have full time offices in the facility to provide rapid response. GAP's 24/7/365 Network Operation Center ensures secure customer access and emergency response capabilities.

 Three separate power grids with UPS and APS sources

 Redundant climate control technology

 Advanced sensors monitoring temperature, humidity and smoke

 FM-200 fire suppression

 Advanced security

TECHNOLOGIES

GitHub



django

Confluence



JIRA

Drupal

ember



Jenkins

MPI

Swift



TensorFlow



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