Overview

• UITS Research Technologies (RT)
  - Changing the way IU uses Cyberinfrastructure
• RT Service Areas
  - From Analysis to Visualization and everything in between
• Services in support of cyber risk mitigation & HIPAA-aligned services
• Positions (function and funding)
What is Cyberinfrastructure (CI)?

• “Cyberinfrastructure” as a technological and sociological solution to the problem of efficiently connecting laboratories, data, computers, and people with the goal of enabling and enhancing research and creative activity

• Consists of environments that support advanced data acquisition, storage, management, integration, analytics, visualization and other computing and information processing services distributed over the network within a single institution (local CI) or beyond (global CI)
IU’s Research Cyberinfrastructure

- Provided by UITS Research Technologies (RT)
  http://researchtech.iu.edu

- Dedicated to supporting research & creative activity, *from art to science and everything in between*

- Strives to support research, publications, grant support with a focus on your success
Margaret Dolinsky, Associate Professor and Research Scientist
H.R. Hope School of Fine Arts, Indiana University Bloomington
RT Services – Campus Bridging: connecting local and (inter)national cyberinfrastructure

Powerful resources as easy to use as your computer’s peripheral devices

• Examples include:
  • IUPUI researchers who are using DC-WAN II to transfer data that’s local to their laboratory to the HPC systems at IUB
  • Research Database Complex Web Services
  • GitHub Enterprise
  • Open Source Mirror
  • Red Hat Enterprise Linux
To Read More...
Click here or use the navigation on the left.

RT Services – Science Gateways

Web interfaces to supercomputers, massive storage, and shared workflows

- RT works to simplify the usage experience of computational resources for users through nationally funded grid projects. The Science Gateways Group does this in particular by implementing open source software to support science gateway projects.
RT Services – Science Gateways

- IU Cyberinfrastructure Gateway – the “one stop shopping” portal for all IU central cyberinfrastructure as well as external resources such as Penguin on Demand, Amazon Web Services, and Microsoft Azure.
- URL available at [http://researchtech.iu.edu](http://researchtech.iu.edu) and in RT printed overview brochure
RT Services – Computation

Fast calculations, advanced simulations, and big data analysis

- **Big Red II** – IU’s main system for high-performance parallel computing
  - Owned solely by IU
  - 1 petaFLOPS
  - CPUs/GPUs
  - 3.5 PB of scratch
  - Available through itaccounts.iu.edu
  - Support/consulting available
  - Tours available
Over 150 disciplines at IU use supercomputing
RT Services – Computation

Fast calculations, advanced simulations, and big data analysis

- **Karst** – IU’s primary Linux cluster computing environment
  - For research and research instruction use
  - Serves as condominium cluster
  - Runs Red Hat Enterprise Linux
  - Accounts available via the Account Management Service (AMS)
RT Services – Computation

Fast calculations, advanced simulations, and big data analysis

- **Mason** – large memory computer cluster
  - Supports data-intensive, high-performance computing tasks
  - Specifically for genome researchers
  - Uses include genome assembly software, large-scale phylogenetic software, and other genome applications
RT Services – Computation

Fast calculations, advanced simulations, and big data analysis

- **Research Database Complex** – research databases and data applications
  - Supports oracle and MySQL Databases
  - Strictly devoted to research
  - Runs Red Hat Enterprise Linux
    - Examples of research projects currently supported
      - Collaborative Initiative on Fetal Alcohol Spectrum Disorders
      - Indiana Spatial Data Service
      - National Gene Vector Biorepository
# RT Services – Computation in 2014

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Jobs</th>
<th>Users</th>
<th>Core Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big Red II</td>
<td>366,060</td>
<td>449</td>
<td>129,997,242.7</td>
</tr>
<tr>
<td>Karst</td>
<td>17,105</td>
<td>61</td>
<td>361,095.4</td>
</tr>
<tr>
<td>Mason</td>
<td>62,534</td>
<td>241</td>
<td>3,004,781.4</td>
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<tr>
<td>Quarry</td>
<td>4,227,369</td>
<td>336</td>
<td>9,764,040.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,673,068</strong></td>
<td><strong>809</strong></td>
<td><strong>143,127,159.5</strong></td>
</tr>
</tbody>
</table>
RT Services – Analysis and software delivery and support

Tools for analytics and big data research

- Software and application consulting – long term and short term
- Technical support
- Software packages like GIS and remote sensing software
- Purchase software
- Software licensing
- Benchmark and evaluate HPC systems

- Tutorials/Documentation
- Public software availability
- Application tuning
RT Services – Data Storage

High-quality storage services for fast access or large data sets

- **Research File System (RFS)**
  - Centralized disk storage designed to support researchers
  - Backed up regularly – 2 copies (IUB and IUPUI)
  - Open to IU community – undergrads/non-IU must have sponsor
    - 100 GB of disk storage
    - Can utilize project areas in file system
    - HIPAA-aligned (does not encrypt stored data – individual users responsible)
RT Services – Data Storage

High-quality storage services for fast access or large data sets

- **Scholarly Data Archive (SDA)**
  - Distributed tape storage for large-scale archival/near-line storage
  - Mirrored – 2 copies (IUB and IUPUI)
  - Open to IU community – undergrads/non-IU must have sponsor
    - 42 PB of tape storage
    - Supports SFTP, HSI, HPSS API
    - HIPAA-aligned (does not encrypt stored data – individual users responsible)
RT Services – Visualization facilities and services

Understanding advanced simulations and big data

• Project consultation
• Test and demonstrate new technologies and procedures
• Tours of IU visualization facilities
• Facility reservations
  • Vis & Collaboration Theater
  • Virtual Reality Theater
  • Science on a Sphere
  • IQ-Series - Wall/Tilt/Table
  • Digitization & 3D
  • Advanced Media Capture
  • Haptic Interface Systems
RT Services – Visualization facilities and services

Examples:

- Digital Golden Book
- 3D scanning, analysis, and printing
- Generating Interest in STEM using 3D
RT Services – Services for biomedical, biological, and health-related research

Clinical, genomic, and HIPAA-aligned services

- Examples include:
  - The Advanced Biomedical IT Core (ABITC)
  - Open Science Grid, Grid Operations Center
  - Indiana CTSI HUB
  - INResearch
  - I2iConnect
RT Services – Services for biomedical, biological, and health-related research

• The Advanced Biomedical IT Core (ABITC)
  • REDCap - a HIPAA aligned service to enable Research Electronic Data Capture by allowing research staff to design and deploy research study forms quickly and easily. REDCap may also be used to conduct electronic surveys for research.
  • Alfresco Share – retiring – currently moving users to BOX. [http://box.iu.edu](http://box.iu.edu)
RT Services – Services for biomedical, biological, and health-related research

- National Center for Genome Analysis Support
  - Consulting for biologists undertaking genome analysis and genomic researchers
  - Genome analysis software
    - Optimization
    - Hardening
    - Enhancement
  - Data storage
  - Results archiving
  - Delivery and assistance in use of supercomputer clusters

Funded by the National Science Foundation
RT Services – Digital Humanities

Provides support to all service areas with an emphasis on digital humanities.

• Recently added brand new service!
RT Services – Education and Outreach

Can help you figure out which RT services might benefit your research and will help with planning events regarding IU Cyberinfrastructure

- In-person classes and workshops
- InfoShares tailored to your campus, department, class
- Tours of facilities like the Data Center or Science on a Sphere
- On-line tutorials and workshops
- Represent IU at conferences and within HPC organizations
RT Services – Grant support and custom fee-based services

Helps with proposals that require cyberinfrastructure. Application development and custom programming for a fee.

- Data Management Plans
- Facilities Statements
- Letters of Support
- Application Development
- Custom programming
The Grant/Data Life Cycle

Pre-Grant
- Preliminary Investigation
- Cyberinfrastructure Design

Proposal
- Proposal Prep
- Budget
- Funding

Execution
- Data Acquisition
- Data Analysis/Simulation
- Data Management
- Data Sharing
- Data Visualization

Post-Grant
- Data Publishing
- Data Archival
- Data Disposal

Renewal
RT Services – Services in support of cyber risk mitigation and IT-28 implementation

Data Center and Cluster services to secure research data

- II-Basic and IUFS
- Scholarly Data Archive (SDA)
- Condominium computing
- Cluster as a service – Penguin Computing
The Health Insurance Portability and Accountability Act of 1996 (HIPAA)

RT helps you be proactive and preventative

- Data Storage
  - Scholarly Data Archive (SDA)
  - Research File System (RFS)
- Shared and project scratch space
  - Data Capacitor II
- Research databases
  - Research Database Complex (RDC)

- Data Management
  - REDCap
  - Collaboration and document sharing
  - Alfresco Share/BOX
Benefits

- Including RT in grant proposals could enhance funding prospects
- A faster research workflow allows you to accomplish more and to think bigger
- You don’t need local hardware or system administration resources
- RT solutions are built professionally and for production use
- Systems and services in research technologies provide high security for your data – we’ve done the hard work to align with HIPAA and to help mitigate cyber risks
Costs

- Nearly all of the RT services described here (supercomputers, storage, visualization resources, training, short-term consulting) are provided free of charge to any IU researcher.
- Projects that require significant RT resource commitment, for instance software development, system administration, etc., are provided at cost, which is usually low and/or are have RT written into grants to cover them.
- Consulting up to a reasonable limit, especially in preliminary phases to help you attract funding, is free.
Positions by Funding Source

- 59 Base Funded
- 36 Grants & Contracts
- 2 Cost Recovery
Contact us …

… even if you do not need us yet!

• It establishes a relationship
• We learn about you, what you are doing, and can anticipate what you might need in the future
• You learn about us and what we can do for you
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