



MANAGED ENVIRONMENT

Should BMI host my applications and servers?

Don Moore – BMI Windows Infrastructure Team Lead



Managed Infrastructure environment

Hardware:

- 33 HP Blade Enclosures
 - (520 physical blade servers)
- 40+ other misc servers
- SAN Storage – SATA/SAS/SSD - total raw space 1.5PB+
 - Disk Utilization
 - Scalable
 - Performance – Designated network
 - Backup time reduced
 - Uptime – 100% - fault tolerant
- Network connectivity - redundant





Managed infrastructure software:

- VMWare – Server and desktop virtualization and private cloud services.
 - 59 VMware ESXi physical servers (13 clusters)
 - 843 Virtual Machines
- Citrix – Application virtualization and desktop publishing. Added security and accessibility via Citrix gateway and web interfaces.
 - 11 XenApp servers - 1 XenDesktop servers





Research Network

- Isolated
- Federated
- Secure
 - Single sign-on
 - VPN
 - VLANs





Virtual Desktop Infrastructure (VDI)

- Virtualization of end-user desktops or applications
- Software with special requirements is installed on one or multiple computers
- Users have the ability to disconnect and reconnect to a running application
- Accessible from CCHMC and Internet
- Easy remote access - Clients can be on a tablet or slow PC



Virtual Desktop Infrastructure (VDI)

- Some virtualized Servers / Desktops / Applications :
 - Imaging Research Center (IRC) Desktops (CCHIPS, MATLAB, MicroDicom, etc...)
 - NextGENe Desktop Viewers
 - GeneSpring Application
 - Toad
 - MS Visual Studio



Application hosting

- GeneSpring - DNA sequencing tools\analysis
- NextGENe - DNA sequencing tools\analysis
- BTM (Biomaterial Tracking & Management)
- WebCamp – Grant Tracking
- Sharepoint Environments (physical & virtual)
- DataPrivilege/DataAdvantage – Used to manage permissions and audit data stored on the RDS storage.
- IIS Web servers (WebApps)
- MSSQL Clusters (14 prod / 12 dev / 2 test)



Managing Shared Licenses

Redundant license servers provide maximum uptime, where supported

- SAS
- Matlab
- Genespring
- Teleform
- SPSS
- VectorNTI



Why allow BMI to host your applications?



-VS-



Datacenter

- Physical security
- Climate controlled
- Redundancy – Infrastructure connectivity & power
- Fire suppression systems
- Flood detection (raised floors)



BMI Offerings

- Multiple environments
 - (Dev, Test & Prod)
- Patching
 - Scheduled & Automated
 - 3rd Party (Tomcat, Adobe, Java, etc...)
- Virus software updates
- Backups
- Security Scans



Infrastructure and Application Monitoring

- SCOM
 - OS, infrastructure and application availability and performance monitoring alerts
- vCOps
 - Virtual infrastructure availability and performance monitoring and alerts



BIOMEDICAL INFORMATICS



- How much does all of this good stuff cost?

<https://bmi.cchmc.org/resources/charge-backs>

Virtual machines

Item	Description	Charge-back	Frequency
Linux - Basic	1GB RAM, 1 CPU, 10GB disk, Linux CentOS	\$100	Annual
Windows Client - Basic	1GB RAM, 1 CPU, 10GB disk, Windows XP	\$100	Annual
Windows Server	Basic 2GB RAM, 1 CPU, 30GB disk, Windows Server	\$500	Annual
VM Extended		Contact us	

- What are the next steps?

help@bmi.cchmc.org



STRUCTURED DATA

Why host my data on BMI databases?

Natalie Reno – BMI Database Team Lead

BIOMEDICAL INFORMATICS



Who are we? What do we do?

BioMedical Informatics Database Infrastructure Group consists of system database administrators.



Install database software
Configure databases
Patch database software
Backup databases
Restore databases
Refresh databases/data
Performance optimization
General database maintenance
Disaster Recovery



Database Flavors

BMI supports clustered full RAC and RAC One-node servers

RAC clusters are for performance and failover

Houses the research data warehouse - I2B2

Houses the clinical data from EPIC

ETL databases for specific datamarts



Database Flavors



Clustered for failover

Can handle large user groups

Houses Sharepoint applications

Houses .Net applications



Database Flavors



Opensource database
geared toward smaller
user groups

Clustered for failover

Houses Drupal (content
management) Websites

Houses RedCap

Houses C-MIND



Database Flavors

PostgreSQL



Newest flavor

Not clustered

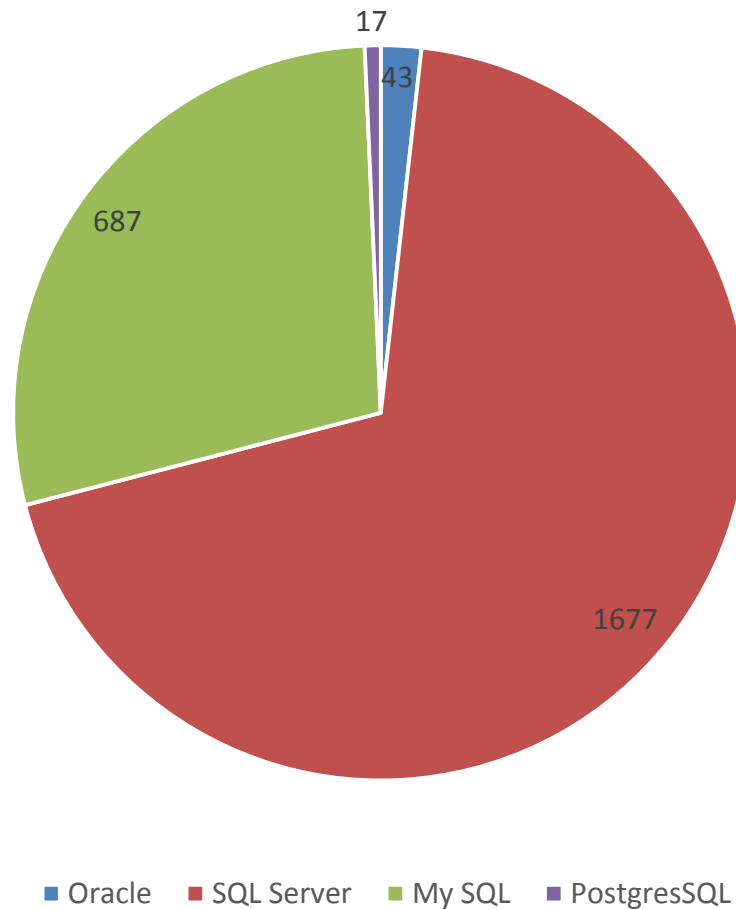
Open source database
touted for reliability, data
integrity, and correctness

Houses Newborn
Screening Translational
Research Network

BIOMEDICAL INFORMATICS



Database Population



BIOMEDICAL INFORMATICS



- What does BMI offer with regards to databases, just in case I didn't take notes?

<https://bmi.cchmc.org/resources/database-servers>

- How much should I budget for a database?
 - Take it for a test drive. Development database is offered at no charge.
 - Production databases are charged depending on usage

Databases

Item	Description	Charge-back	Frequency
MySQL - Basic	One database w/ 10GB quota	Free	
MySQL - Extended	One database instance w/ quota > 10GB	Contact Us	
SQL Server - Basic	One database w/ 10GB quota	\$100	Annual
SQL Server - Instance	One database instance w/ 100GB quota	\$1000	Annual
Oracle - Basic	One database w/ 10GB quota	\$200	Annual
Oracle - Instance	One database instance w/ 100GB quota	\$2000	Annual

- I can't wait to get started. How do I contact the BMI Database Infrastructure team?

help@bmi.cchmc.org



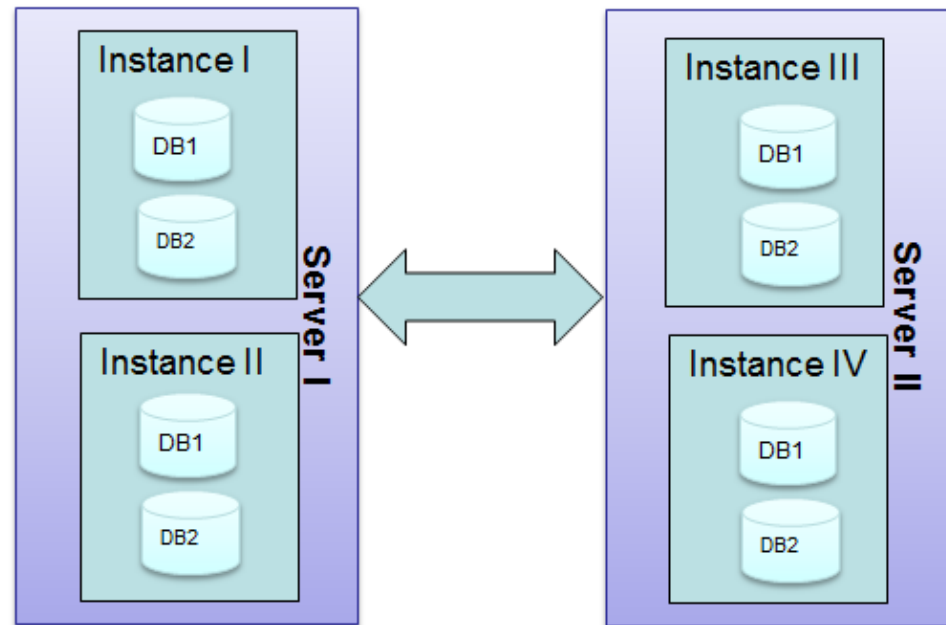
Tough Decision – Instance versus Database ?

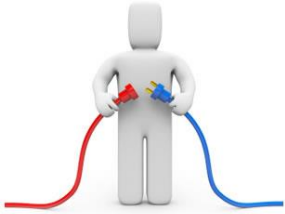
- Database resides in an instance
- Database is a collection of data structures
- Instance can host multiple databases
- Database shares all instance resources with other databases
- **Scenario 1:** I can share and I really don't need a lot of memory and CPU for my work.

Database

- **Scenario 2:** I hate sharing. I want to make sure that I have what I need every time I use my instance.

Instance





I am so excited.
I have my very own database!
Now what?

From Desktop

- Logging in to Research VPN is required for accessing RNE/Bubble DB resource

From Service Node (preferred)

From Web Interface

- phpMyAdmin is provided for MySQL databases

From Citrix Environment (preferred)

- RNE -
<https://connect.research.cchmc.org/Citrix/XenApp/auth/login.aspx>
- Internal - <https://bmicitrixds1/Citrix/AccessPlatform/site/default.aspx>





I'm connected. . .

Where's my data?



Need help in funneling data into the database. We have a team for that – contact help@bmi.cchmc.org to get in touch with the developer that's right for you.



The Future . . .

Microsoft SQL Server 2014 (In Progress)

Oracle 12c (In Progress)

MySQL 5.6

PostgreSQL 9.5

Questions?