

**LORIS** ImageBank

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# Today's Challenges

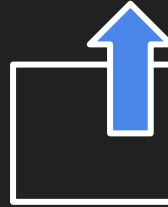
## Problem Domain



Functionality



Speed

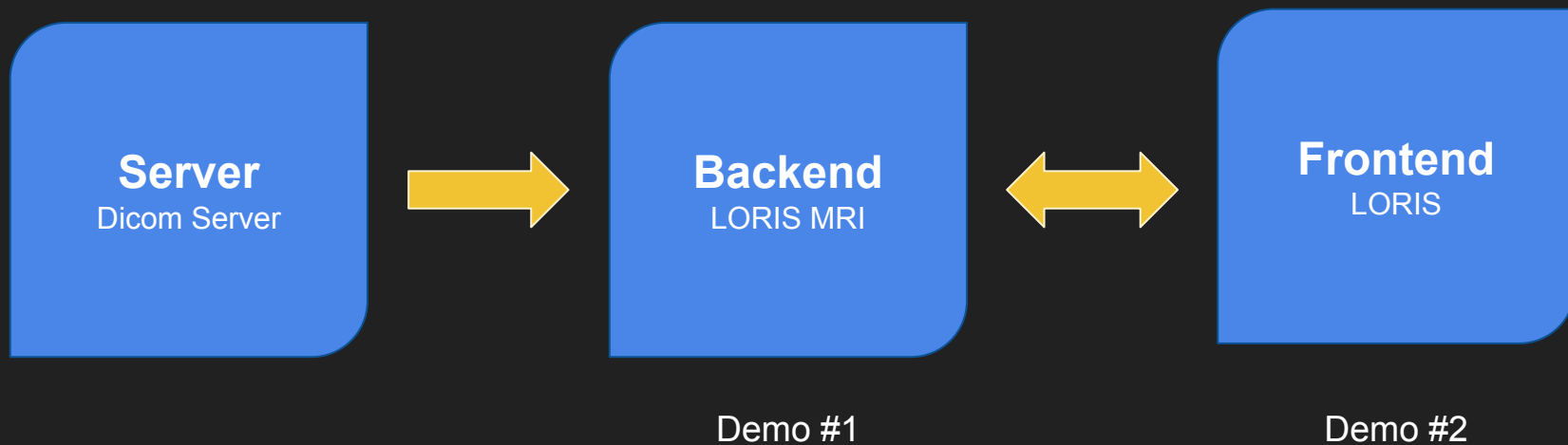


Scalability



Automation

# Design Process





# Server

DICOM Server

S

B

F

# Patient Registration



Siemens 3T Prisma

**Patient Registration**

PATIENT	PROCEDURE	HOSPITAL
<b>Last name</b> <input type="text"/>	<b>Accession No</b> <input type="text"/>	
<b>First name</b> <input type="text"/>	<b>Request ID</b> <input type="text"/>	
<b>Title</b> <input type="text"/>	<b>Requested procedure(s)</b> <input type="text"/>	
<b>Patient ID</b> <input type="text"/>	<b>Study</b> <input type="text"/>	
<b>Date of birth</b> <input type="text"/> [dd-MMM-yy]	<b>Study comment</b> <input type="text"/>	
<b>Sex</b> <input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Other	<b>Patient position</b> <input type="text"/>	
<b>Age</b> <input type="text"/> <b>Years</b> <input type="text"/>		
<b>Height</b> <input type="text"/> [m]		
<b>Weight</b> <input type="text"/> [kg]		
<b>Additional info</b> <input type="text"/>		
<input type="button" value="Details"/>		
<b>Referring physician</b> <input type="text"/>	<b>Institution name</b> <input type="text"/> McConnell Brain Imaging Center	
<b>Requesting physician</b> <input type="text"/>	<b>1. Performing physician</b> <input type="text"/> RESEARCH	
<b>Admission ID</b> <input type="text"/>	<b>1. Operator</b> <input type="text"/> RL	
<input type="button" value="Preregister"/> <input type="button" value="Exam"/> <input type="button" value="Search"/> <input type="button" value="Cancel"/>	<input type="button" value="Help"/>	

ISO\_IR 100

Patient Registration

S

B

F

# Patient Registration

Patient Name

Patient ID

PI

The screenshot shows a 'Patient Registration' window with two main panels: 'PATIENT' and 'PROCEDURE'. The 'PATIENT' panel contains fields for 'Last name' (circled in yellow), 'Patient ID' (circled in yellow), 'Date of birth' (01-Jan-75), 'Sex' (Male selected), 'Age' (41), 'Height' (m), 'Weight' (65.00 kg), and 'Additional info'. The 'PROCEDURE' panel contains fields for 'Accession No', 'Request ID', 'Requested procedure(s)' (Dr Rick Hoge Santi), 'Study' (Dr Rick Hoge Santi), 'Study comment', 'Patient position' (Head First - Supine), 'Institution name' (McConnell Brain Imaging Center), and 'Performing physician' (Saiva, circled in yellow). At the bottom, there are buttons for 'Preregister', 'Exam', 'Search', 'Cancel', and 'Help'. The status bar at the bottom right shows 'ISO\_IR 100'.

Annotations:

- Yellow circle around 'Last name' field.
- Yellow circle around 'Patient ID' field.
- Yellow circle around 'Performing physician' field.
- Yellow arrow pointing from 'Patient Name' to 'Last name'.
- Yellow arrow pointing from 'Patient ID' to 'Patient ID'.
- Yellow arrow pointing from 'PI' to 'Referring physician'.
- Yellow arrow pointing from 'PI Team Member (Researcher)' to 'Performing physician'.

PI Team Member  
(Researcher)

Patient Registration



# DCMTK - DICOM Toolkit

## Storescp & Transfer Protocol

### Parameters:

- IP = 132.206.178.113 (imaging.bic.mni.mcgill.ca)
- AETITLE = IMAGING
- Port = 50082

# Data Transfer Command

```
/usr/bin/storescp -d --output-directory  
/dicom/data/dicom/ +xa +ac  
--sort-on-patientname --aetitle IMAGING  
--disable-host-lookup --eostudy-timeout 30  
--exec-on-eostudy /dicom/bin/dicomtar #p #f  
50082
```

# Backend

LORIS MRI

S

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# Imaging Scripts

**BIC**

1

MINC Conversion + Log

Stores minc in /dicom/data/minc

2

Dicomtar + Log

Stores tar in /data/img/data/tarchive

**LORIS**

3

TarchiveLoader + Log

Stores pic in /data/img/data/tarchive/pic

Stores minc in /data/img/data/tarchive/assembly

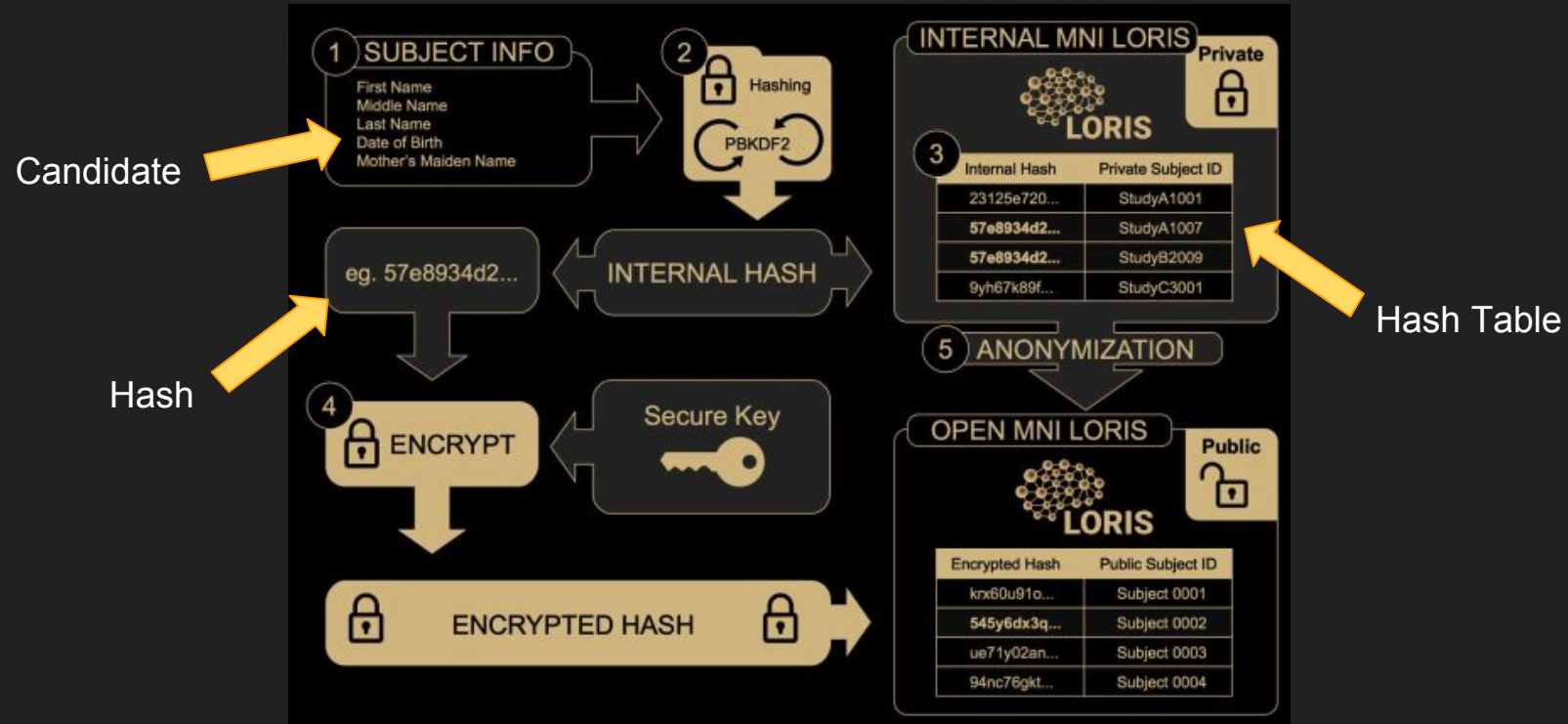
LORIS MRI Imaging Pipeline

# Dicom Archive

PatientID	PatientName	DateAcquired	ReferringPhysicianName	PerformingPhysicianName
BICDCC9989_963206_V01	LORIS_STAGING_TEST1	2016-05-11	NULL	NULL
BICDCC9994_207083_V01	LORIS_STAGING_TEST_2	2016-03-31	rhoge	spaiva
BICDCC9995_926982_V01	LORIS_STAGING_TEST_3	2016-05-04	rhoge	spaiva
10082016	BICDCC9983_219988_V01	2016-08-08	rhoge	spaiva

Tarchive Table

# Hash Function & Candidate Module



Hash Process

# Hash Function & Candidate Module

	CandID	hash_value
	158500	365f9af63be2cd70f...
	187360	ae5668487f7b354c3...
	378835	c27f6da3954f9a287...
	499334	6225931f25b9056f9...
	651416	b9f8abaf2ffce9cca...
	659980	818ae431452408326...
	893234	cc048c56d53b7abc4...

Hash Table

Demo #1



# Frontend



## LORIS

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# LORIS ImageBank



login

[Forgot your password?](#)  
[Request Account](#)

A WebGL-compatible browser is required for full functionality (Mozilla Firefox, Google Chrome)  
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Created by MCIN  
Developed at Montreal Neurological Institute and Hospital

imaging.bic.mni.mcgill.ca

# Dicom Archive

BIC ImagingCandidateImagingAdmin

Site: Data Coordinating CenterAdmin account

Dicom Archive

Selection Filter

Site

All

Patient ID

Patient Name

Referring Physician (PI)

Researcher

Acquisition Date

Show Data

Clear Form

7 subject timepoint(s) selected.

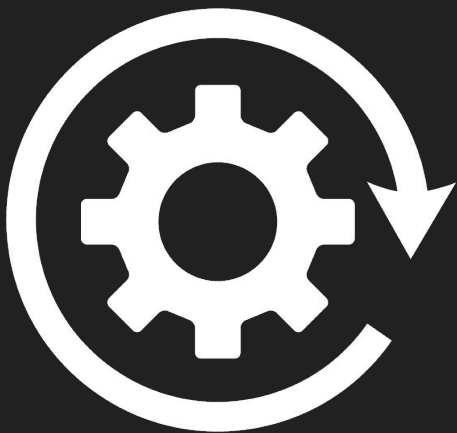
No.	Patient ID	Patient Name	Acquisition	File Name	Metadata	Imaging Browser	PI	Researcher	Download
1	BIDCC9994_207083_V01	LORIS_STAGING_TEST_2	2016-03-31	2016/DCM_2016-03-31_BIDCC9994_207083_V01.tar	<a href="#">View Details</a>	<a href="#">View Images</a>	rhoge	spaiva	<a href="#">Download DICOM</a>
2	BIDCC9995_926982_V01	LORIS_STAGING_TEST_3	2016-05-04	2016/DCM_2016-05-04_BIDCC9995_926982_V01.tar	<a href="#">View Details</a>	<a href="#">View Images</a>	rhoge	spaiva	<a href="#">Download DICOM</a>
3	BIDCC9989_963206_V01	LORIS_STAGING_TEST1	2016-05-11	2016/DCM_2016-05-11_BIDCC9989_963206_V01.tar	<a href="#">View Details</a>	<a href="#">View Images</a>			<a href="#">Download DICOM</a>
4	16.07.30-10:28:35-DST-1.3.12.2.1107.5.2.32.35056	ASD_017	2016-07-30	DCM_2016-07-30_ASD_017_20160730_105544414.tar	<a href="#">View Details</a>				<a href="#">Download DICOM</a>
5	16.07.30-11:27:16-DST-1.3.12.2.1107.5.2.32.35056	ASD_016	2016-07-30	DCM_2016-07-30_ASD_016_20160730_121158746.tar	<a href="#">View Details</a>				<a href="#">Download DICOM</a>
6	16.07.30-11:51:56-DST-1.3.12.2.1107.5.2.32.35056	ASD_053	2016-07-30	DCM_2016-07-30_ASD_053_20160730_132149873.tar	<a href="#">View Details</a>				<a href="#">Download DICOM</a>
7	10082016	BIDCC9983_219988_V01	2016-08-08	2016/DCM_2016-08-08_BIDCC9983_219988_V01_20160810_103142313.tar	<a href="#">View Details</a>	<a href="#">View Images</a>	rhoge	spaiva	<a href="#">Download DICOM</a>

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Created by MCIN

New Dicom Archive Module

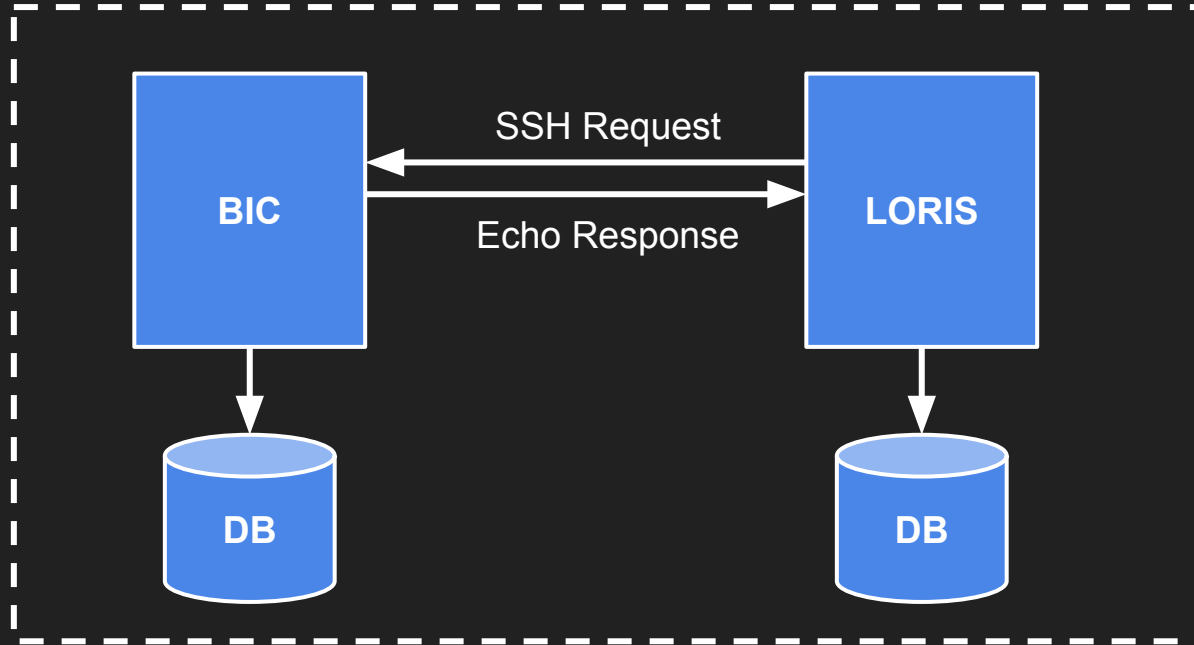
# Demo #2

# Currently In Progress



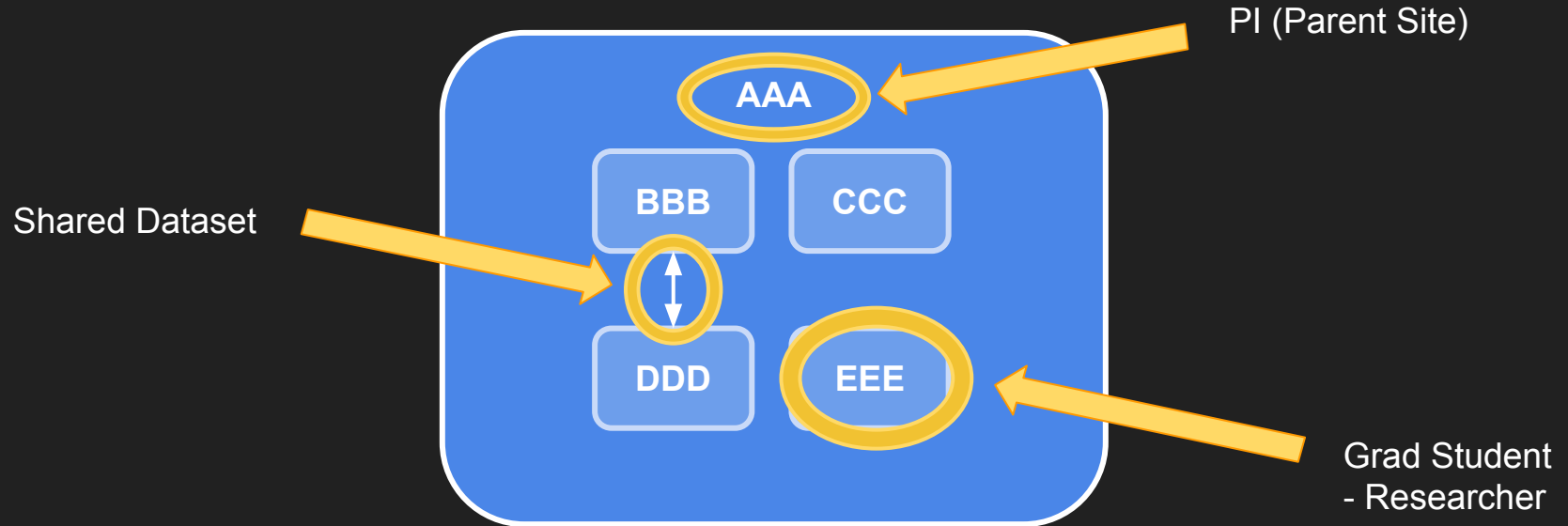
- BIC Unix Login Integration
- LORIS Super Site
  - Group Permissions
- Improvements in UX and UI
  - Dicom-Archive
  - Candidate Registration
  - Permissions
- Tutorials

# BIC Unix Login Integration



BIC NIS Domain

# LORIS Super Site



Parent - Child LORIS Site Model

# Conclusion

- Development of a great product for BIC users :)
- Automated, fast, and scalable data repository
- LORIS Functionalities (Visualizations, QA, Statistics, etc)
- Set of new exciting features coming soon
- Public Release: soon



# Special Thank You

- **Sylvain Milot** (SysAdmin)
- **Mouna Safi-Harab** (Imaging Scripts)
- **Jordan Stirling** (Hash Function)
- **Pierre Rioux** (SSH Authentication)
- **Rick Hoge** (Functionality)
- **LORIS Team** (Help & Support)



# Q & A

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