



MUSE V9 SYSTEM OVERVIEW

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MGH Department of
Biomedical Engineering

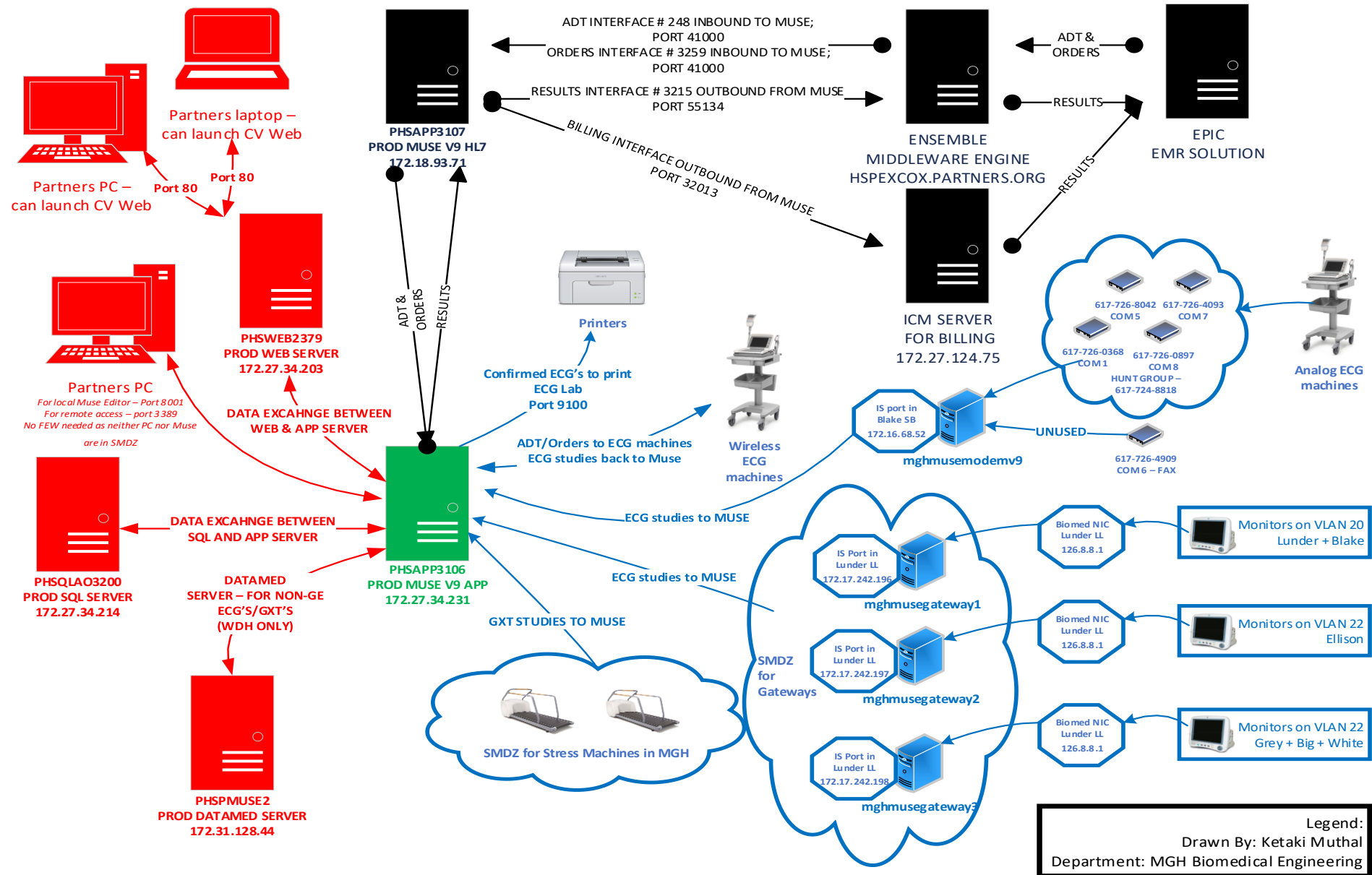
MUSE – Marquette Universal Storage for Electrocardiographs

- What's new with Muse V9–
 - SMDZ is gone. None of the Muse app/sql servers are in SMDZ anymore
 - They are on Group 2 of server patching schedule
 - The SQL server has a redundant always on backup. Primary in Needham Data Center and 'always on' backup in Marlboro Data Center'
 - Museadmin account is now named: sq23
 - This account is responsible for configurations within the application
 - Musebkgnd account is now named: sq7
 - This account is responsible to run all Muse services
 - Password for sq23 and sq7 are managed by CyberArk. CE's have access to change/view passwords of the safe that hosts these 2 accounts – sq7 & sq23
 - CyberArk is a Partners application for password management

MUSE – General information/ Background

- MUSE is a system that stores ECG's and Stress studies for Cardiologists to view and interpret/read/confirm; for clinicians to view/print as needed.
- MUSE receives ADT and Orders for an ECG or Stress study from hospital EMR (EPIC) solution via interface -
 - # 248 inbound ADT to Muse on port 41000
 - # 3259 inbound Orders (ORM) to Muse on port 41000
- MUSE sends confirmed ECG messages as results for viewing/filing/charting to hospital EMR (EPIC) via interface –
 - # 3215 outbound from Muse on port 55134
- MUSE also sends a message to its billing solution partners (ICM) which in turn send a message to hospital EMR solution (EPIC) via a separate interface -
 - Billing interface outbound from Muse on port 32013

MUSE – System Diagram



MUSE Servers

- Production servers (CE's can login using your Partners credentials)

Server Name	Partners IS IP Address	Description	Location
PHSAPP3106	172.27.34.231	Application and wireless cart server	Needham data center
PHSAPP3107	172.18.93.71	HL7 and interface server	Needham data center
PHSQLAO3200(SQL CLUSTER)	172.18.93.141	SQL database	-
PHSQLAO3200A	172.18.93.73	SQL database	Needham data center
PHSQAO3200B	172.27.34.155	SQL database	Marlboro data center
PHSWEB2379	172.27.34.203	Web server for ECG viewing	Needham data center
PHSPMUSE2	172.31.128.44	DataMed server for non-GE data	Needham data center

- Test servers (CE's can login using your Partners credentials)

Server Name	Partners IS IP Address	Description	Location
PHSAPP3105	172.18.93.204	Application, HL7 and cart server	Needham data center
PHSSQL2246	172.27.34.50	SQL database	Needham data center
PHSWEB2378	172.18.93.206	Web server for ECG viewing	Needham data center

MUSE Gateways and Modem PC's

- CE's and Technicians can login to the gateways or modem PCs' using administrator account
 - User name: Administrator; Password: Muse!Admin

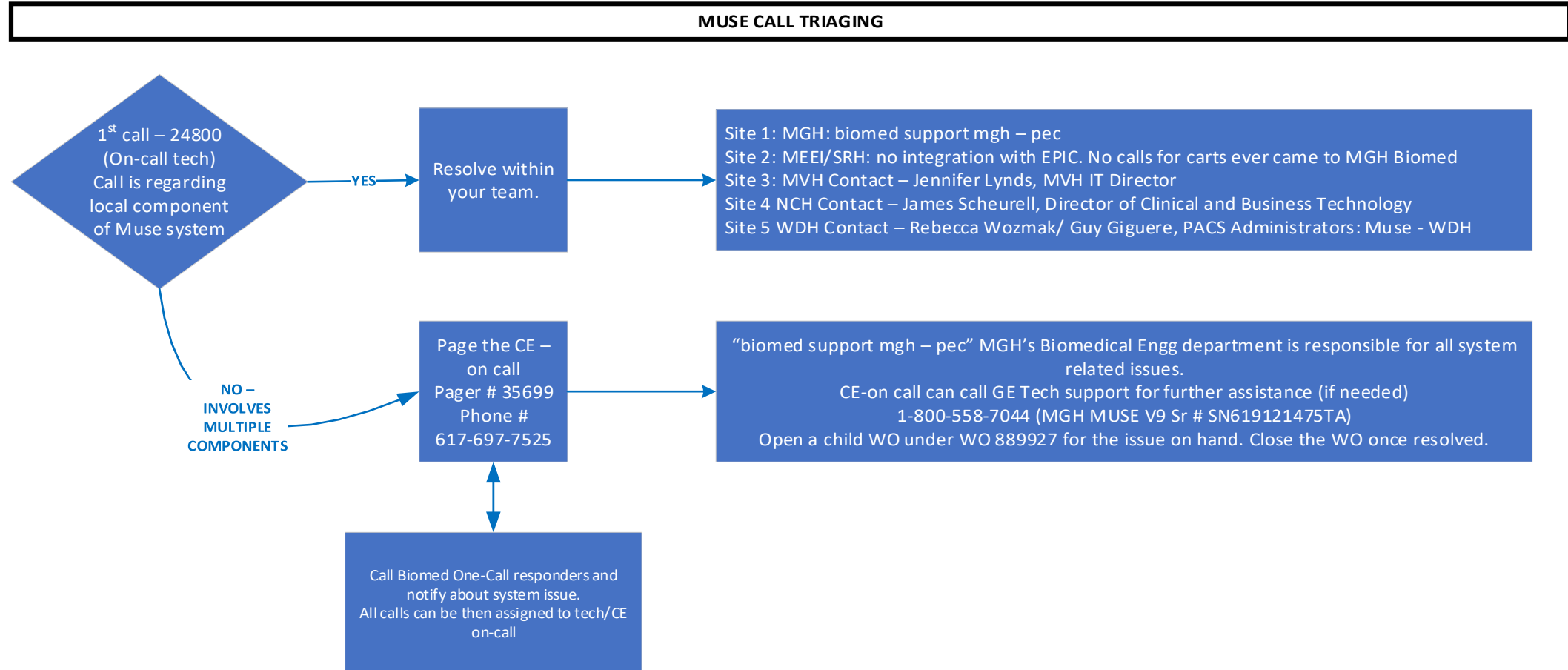
Gateway Name	Partners IS IP Address	Description	Location
mghmusegateway1	172.17.242.196	Network Gateway for ECG Transmission from Bedside monitors on VLAN20 (Blk and Lun floors)	Lunder basement LL040
mghmusegateway2	172.17.242.197	Network Gateway for ECG Transmission from Bedside monitors on VLAN21 (Ell floors)	Lunder basement LL040
mghmusegateway3	172.17.242.198	Network Gateway for ECG Transmission from Bedside monitors on VLAN22 (Wht, Gry, Big floors)	Lunder basement LL040
mghmusegtwy1	TBD	Backup to mghmusegateway1	Big 12
mghmusegtwy2	TBD	Backup to mghmusegateway2	Big 12
mghmusegtwy3	TBD	Backup to mghmusegateway3	Big 12
mghmusemodemv9	172.16.68.52	Connects to all modems listed below to send ECG's to Muse app server	Blake Sub-basement
CSIMODEM1	617-726-8024	Connected to MGHMUSEMODEM via Hunt Group Number (617-724-8818). Receives ECG's from Carts via phone line.	Blake Sub-basement
CSIMODEM2	617-726-0368		
CSIMODEM3	617-726-0897		
CSIMODEM4	617-726-4093		

MUSE – Capacity and Responsibility

- MGH MUSE has 5 sites – each site has multiple locations
 - Site 1 – MGH (~190 locations)
 - Site 2 – MEEI and SRH (~12 locations)
 - Site 3 – MVH (~10 locations)
 - Site 4 – NCH (~4 locations)
 - Site 5 – WDH (~32 locations)
- MGH Biomedical Engineering team is responsible for all individual components of Muse for Site 1 along with all system components of Muse which includes the servers and interfaces with EPIC.
- Each individual site is responsible for their own local components of Muse.
- What are local components in a Muse system?
 - ECG Cart – battery, phone cable, any hardware on the cart, leads
 - Acquisition module; module cable
 - Stress Machines – leads, patch cable etc.
 - Wireless modules (if any), power supply
 - Barcode Scanner (if any)
- What are system components in a Muse system?
 - All servers associated with Muse system
 - All applications associated with the servers
 - All interfaces associated with the Muse system
 - All printers associated with the Muse system

MUSE – Troubleshooting tips

- Determine if the Muse call is local or system call.



MUSE – Troubleshooting tips

- Please refer to this document for troubleshooting tips –

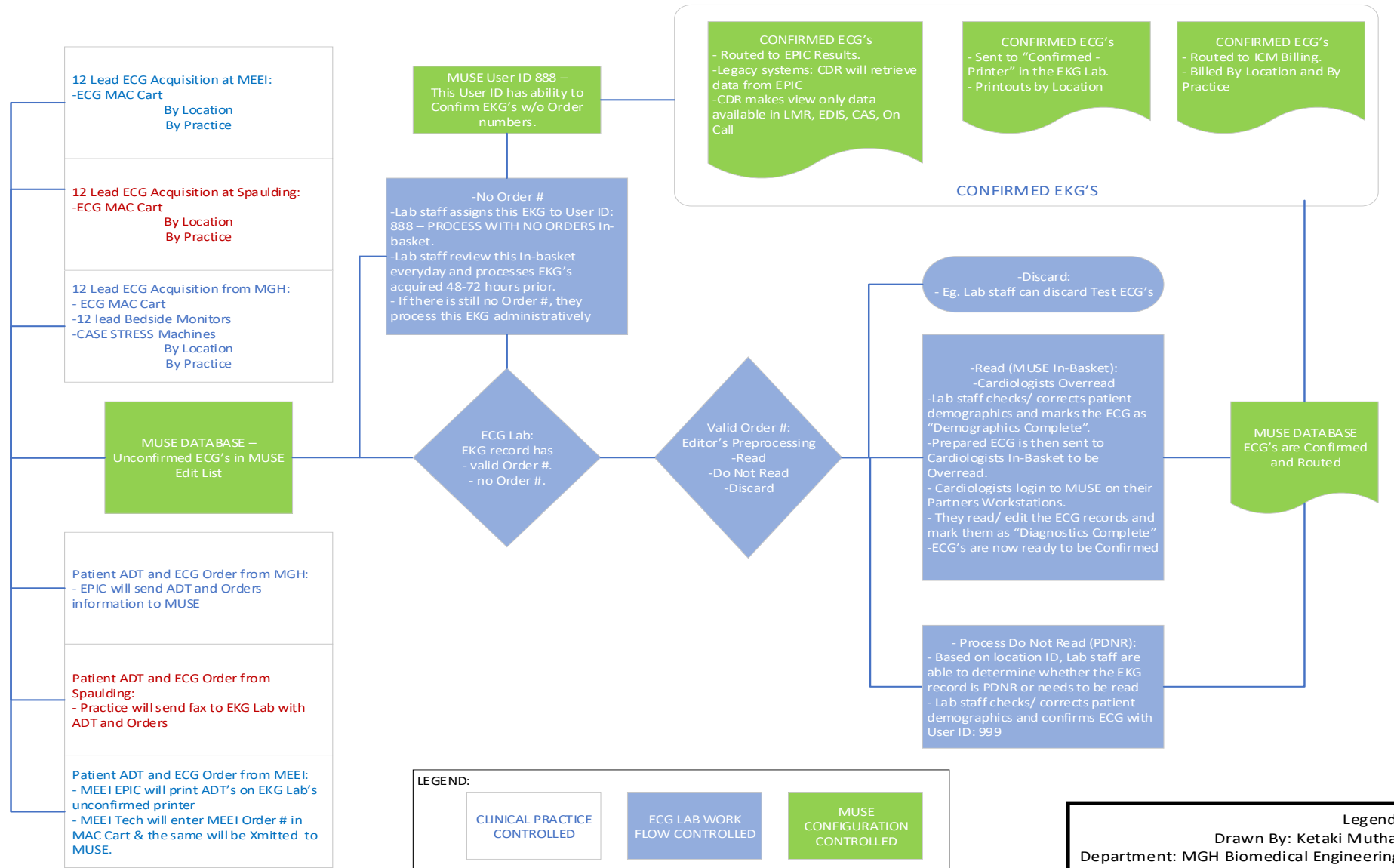
<L:\DBEMAIN\Safety\Resource Book\MGH\MGH MUSE\MUSE V9 – MGH MuseV9 Troubleshooting Guide>

- The same document is posted on the Biomed website under –
 - MGH Technical Resources
 - MGH Call Tech Resources
 - MGH MuseV9 Troubleshooting guide
- Similarly, other documents have been updated on the Biomed Website too –
 - MGH Muse V9_Cart Location numbers
 - MGH Muse V9 System Overview (detailed description of Muse system) – *yet to be uploaded*
 - MGH Muse V9 System Summary (this presentation)

MGH MUSE – Important Contacts

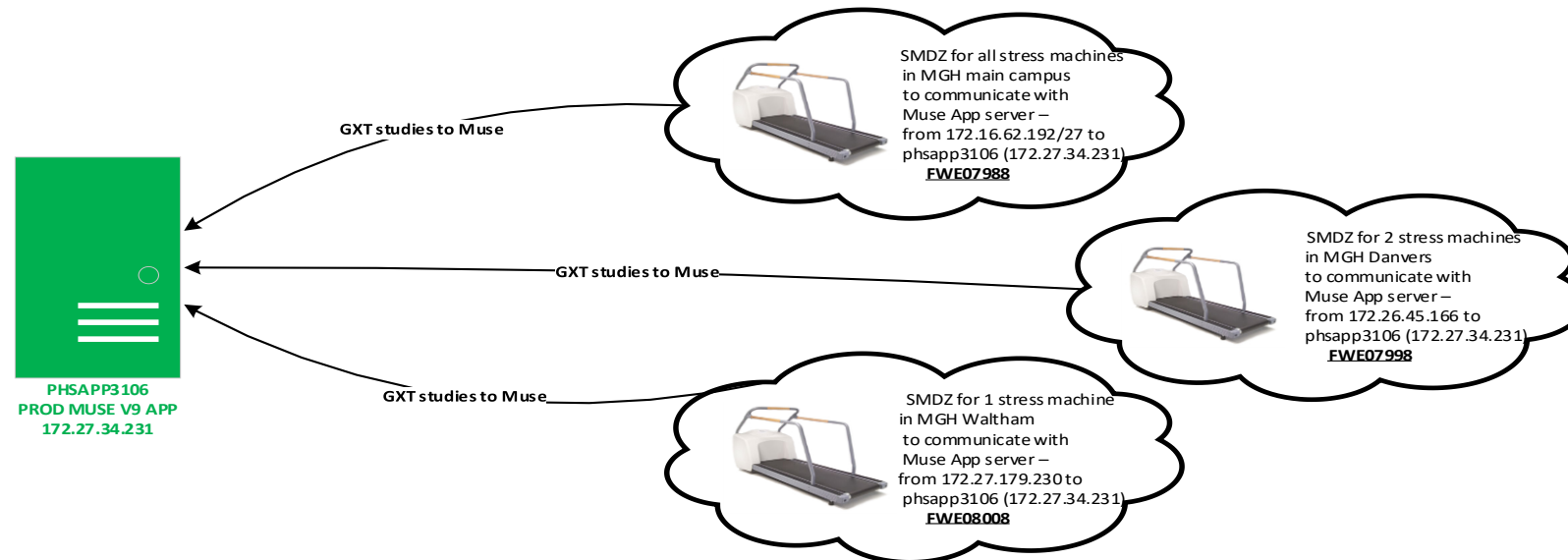
- MGH ECG Lab –
 - Contact for ECG edit queries – MRN, name, date and time correction on already transmitted ECG's
 - Main Campus –
 - Names – Ping Mah and Shirley Thomas
 - Phone – 617-726-2885
 - Fax – 617-726-7439
 - Location – Bulfinch Room 114
 - Danvers –
 - Names – Pam Silva and Danielle Bowe
 - Phone – 978-882-6555
 - Location – E102-02 Nuc Cardiology

MGH MUSE – ECG Processing Workflow



MGH MUSE – Stress Machine Information

Location	Serial number	Room	Correct IP	Correct MAC	Jack no. on the wall
YAW5	SJP13471052SA	5016	172.16.62.220	00-E0-F4-2A-31-CD	YC05C- 117
YAW5	SJP13210374SA	5017	172.16.62.215	00-E0-F4-29-A8-BE	YC05C-064-A
YAW5	SJP13471054SA	5020	172.16.62.214	00-E0-F4-2A-2F-0F	YC05C-069-A
YAW5	SJP13230463SA	5034	172.16.62.221	00-E0-F4-2F-CB-55	Not plugged in sharing port w SJP12371052SA
YAW5	SPZ18240024SA	5034	172.16.62.216	C4-00-AD-0D-0E-9E	YC05C-102-A
YAW5	SN215461960SA	5040	172.16.62.217	00-E0-F4-2F-3B-30	YC05C-094-A
YAW5 - ECHO	SH711096729SA		172.16.62.219		
BLK260	SN215461962SA	276	172.16.62.198	00-E0-F4-2F-38-18	276-1 VD
BLK260	SN215461965SA	278	172.16.62.199	00-E0-F4-2F-38-81	278-3 VD
BLK PET	SPZ18240026SA	272	172.16.26.206	C4-00-AD-0D-0E-99	in PET/CT ROOM 274
BLK CARDIAC ECHO	SPZ19280003SA	200	172.16.62.201	C4-00-AD-25-EE-4F	200-7 VD
MGH West	SPZ19370040SA	535	172.27.179.230	C4-00-AD-38-7F-91	143/144 535-4
MGH Danvers	SPZ19370023SA	1291	172.26.45.166	C4-00-AD-38-7E-13	1B 137 1291-3
MGH Danvers	new sr. no. needed	1293			1B 149 1293-1
YAW5	SPZ18220033SA	5-216	CANNOT FIND. RETIRED?		YC05C-048-A
50 STANIFORD EXE HLTH	SHS12110670SA	MACHINE NEEDS TO BE UPGRADED. GE WILL UPGRADE. UPGRADE KIT RECEIVED PRAC DOESN'T DO STRESS STUDIES ANYMORE. PATIENTS WILL GO TO YAW 5			



MUSE – Printer Information

MUSE® System - Setup

System View Action Tools Help



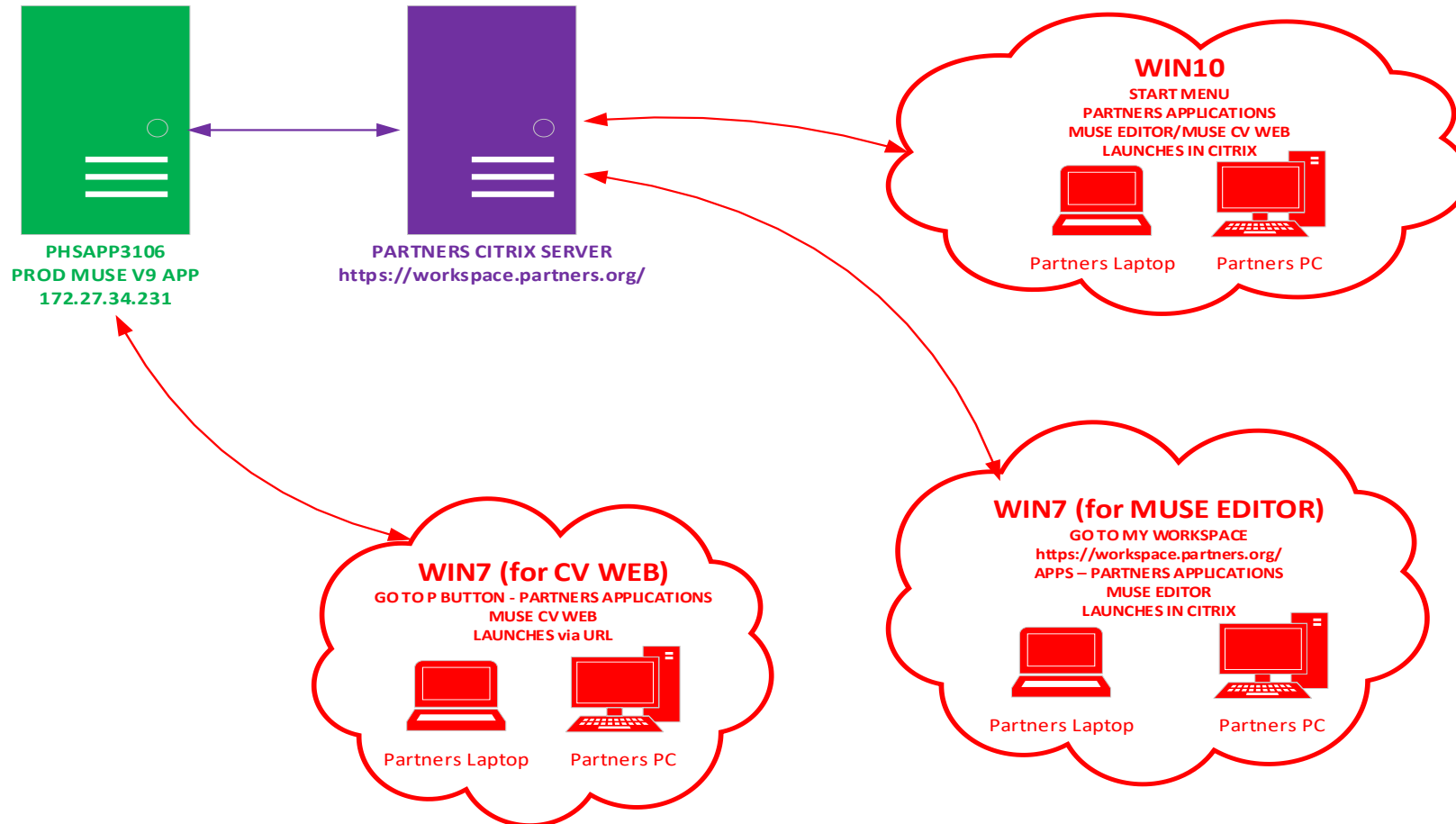
Navigation

Devices 25 Item(s)

- System
- System
- Sites
- Users
- Roles
- Devices
- Formats
- Modems
- Scheduled Tasks
- Share Folder
- Advanced
- LDAP Fields
- LDAP Groups
- Site
- Locations
- HIS Locations
- Report Distribution
- Statement Library
- Drug Trials

Device ID ▲	Type	Name	Destination	Batch Device (HL7 Only)	
300	HL7	z-HL7 Results	172.18.93.71	No	
301	HL7	NOT IN USE - z-HL7 Billing	172.18.93.71	No	
302	PostScript Printer	MGH Confirmed Printer	\\PHSAPP3106\MGHCONFIRMED		MGH Printers
303	PostScript Printer	MGH Unconfirmed Printer	\\PHSAPP3106\MGHUNCONFIRMED		
304	PostScript Printer	MGH Yawkey Stress Printer	\\PHSAPP3106\MGHSTR		
305	PostScript Printer	MGH Danvers Confirmed Printer	\\PHSAPP3106\DACC CON		
306	PostScript Printer	MGH Danvers Practice Printer	\\PHSAPP3106\DACCPRAC		
307	PostScript Printer	MGH Danvers Unconfirmed Printer	\\PHSAPP3106\DACCUNCON		
313	HL7	z-HL7 ICM Billing	172.18.93.71	No	
315	Folder	SRH Daily Logs	C:\SRHDailyLogs		
317	Folder	MarillOutput	C:\SRHDailyLogs		
318	Folder	GETest	E:\getest		
319	Folder	List of Locations	C:\List of Locations		
320	HL7	EPIC HL7 RESULTS	172.18.93.71	No	
321	HL7	EPIC HL7 BILLING	172.18.93.71	No	
322	Folder	Temporary KSM	E:\hilltop		
323	PostScript Printer	MGH Danvers Con/Uncon Printer	\\PHSAPP3106\DACCADDPRINTER		MGH Printers
325	Folder	Daily Billing Report	E:\MUSE\Daily Billing		
332	PostScript Printer	MVH Printer	\\PHSAPP3106\MVHPRINTER		MVH Printers/Reports
333	Folder	REPORTS FOLDER	C:\Users\mir7\Desktop\REPORTS FOLDER		
334	PostScript Printer	NCH OP Lab	\\PHSAPP3106\NCH OP Lab		NCH Printers/Reports
335	PostScript Printer	NCH ED Charge Desk	\\PHSAPP3106\NCH ED Charge Desk		
336	PostScript Printer	NCH MED SURG	\\PHSAPP3106\NCH MED SURG		
337	PostScript Printer	NCH Clinical & Business Tech	\\PHSAPP3106\NCH Clinical & Business Tech		
339	Folder	WDH Gauthier Crowley ECG's	\\phsapp3106\WDHReports		WDH Printers/Reports

MUSE – How to access MuseV9?



Legend:
Drawn By: Ketaki Muthal
Department: MGH Biomedical Engineering

MUSE – CV Web Link/ PHS MUSE Viewer Link

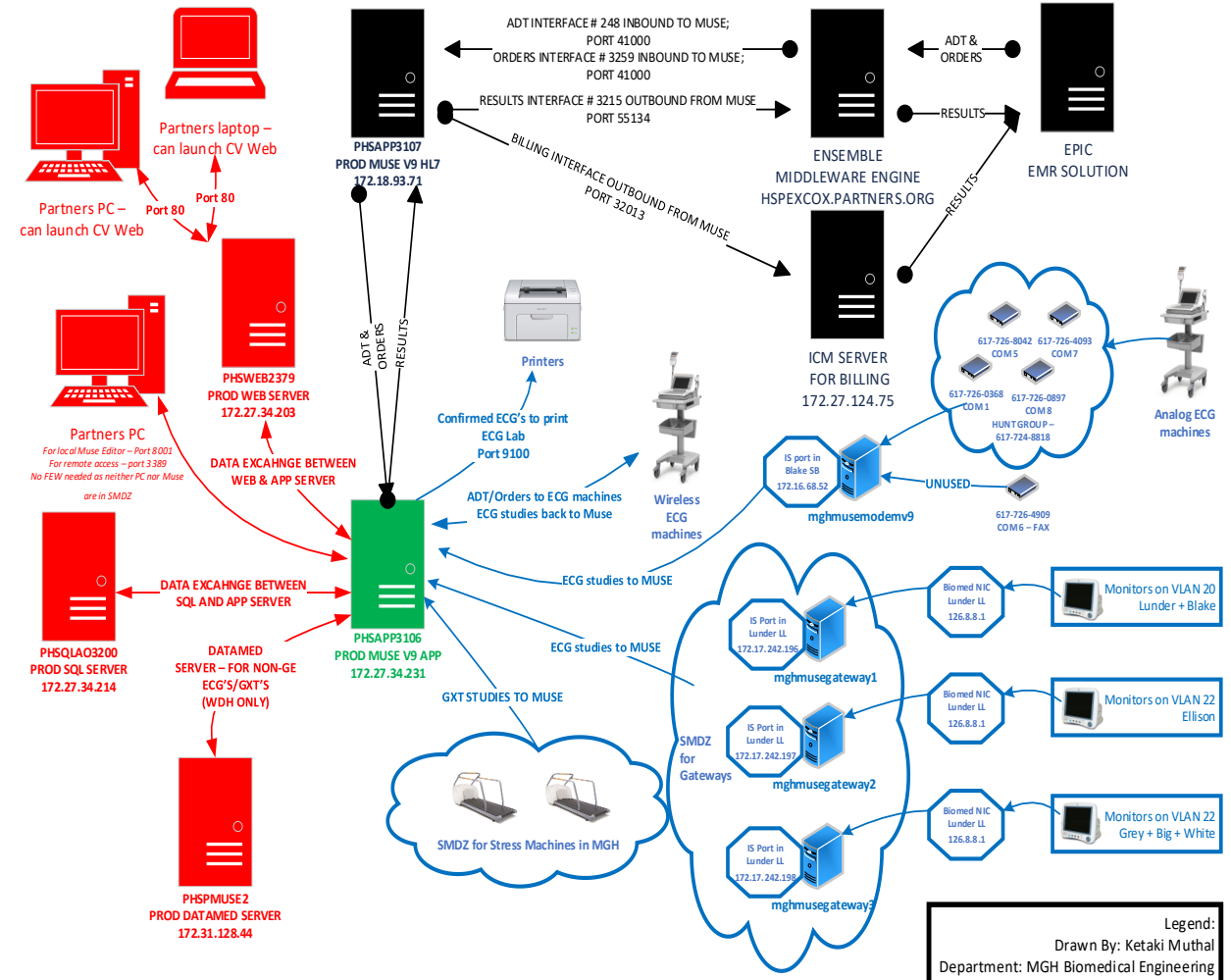
- ECG's can be viewed using Muse Web server. The link is – <http://mghmuse.partners.org/>
- The same link can be launched by accessing MUSE CV Web application under Partners app menu. All Biomed staff members should have access to it.

P.S.: When you are looking for a patient's ECG using this link/app; please make sure you enter preceding "00" or "double zeros" to find a patient.

- This link is further modified by PHS-CAS (CDR) group to be - <http://phsmuseviewer.partners.org/> to be used as a Web link in EPIC for that patient whose record you are within in EPIC.
- Both the link ultimately resolve to the Muse CV Web server.
- The PHS muse viewer link should refrain users to launch multiple CV Web instances for different patients, such that users can view ECG of only one patient at a time - safety feature.

MGH MUSE - SMDZ

- The adjacent diagram shows Muse system architecture
- The components highlighted in the blue cloud are the only components that remain in SMDZ
- The reason they continue to stay in SMDZ are either they connect to the Biomed Network or they cannot be patched per Partners IS schedule
- What is SMDZ ? Safe Medical Device Zone, where equipment cannot be patched, they stay untouched and hence vulnerable to cyber threats.



MUSE – Disaster Recovery

- MGH Biomed to update disaster recovery plans and steps with Partners IS – *yet to be done*
- Disaster impact – loss of data and high turn around time for recovery
- A disaster recovery plan should include a redundant server for at least the SQL server, mainly to address loss of data and quick turn around incase the primary SQL server goes down. Muse holds all its data on the SQL database which also takes most time to recover
- We have availed SQL always on feature for Muse prod SQL server where 2 SQL servers are provisioned for us – PHSQLAO3200A and PHSQLAO3200B located in NDC and MDC respectively. The B server is real time back-up of the A server. In the event of disaster, the real time backup can be made primary and Muse can continue to function with minimal downtime and no loss of data
- No redundant app servers are provisioned at this time.

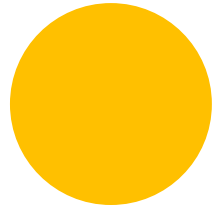
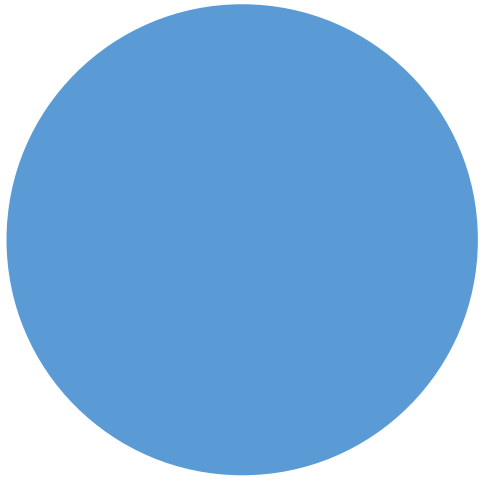
MUSE - Documentation

- Main folder –

\\Sfa1\sfa\DBEMAIN\Safety\Resource Book\MGH\MGH MUSE\MUSE V9

- MUSE V9 SP 9 software –

\\Sfa1\sfa\DBEMAIN\Safety\Resource Book\MGH\MGH MUSE\MUSE V9\Installation files
from GE\Muse V9SP9 SW



Thank you!

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Engineering