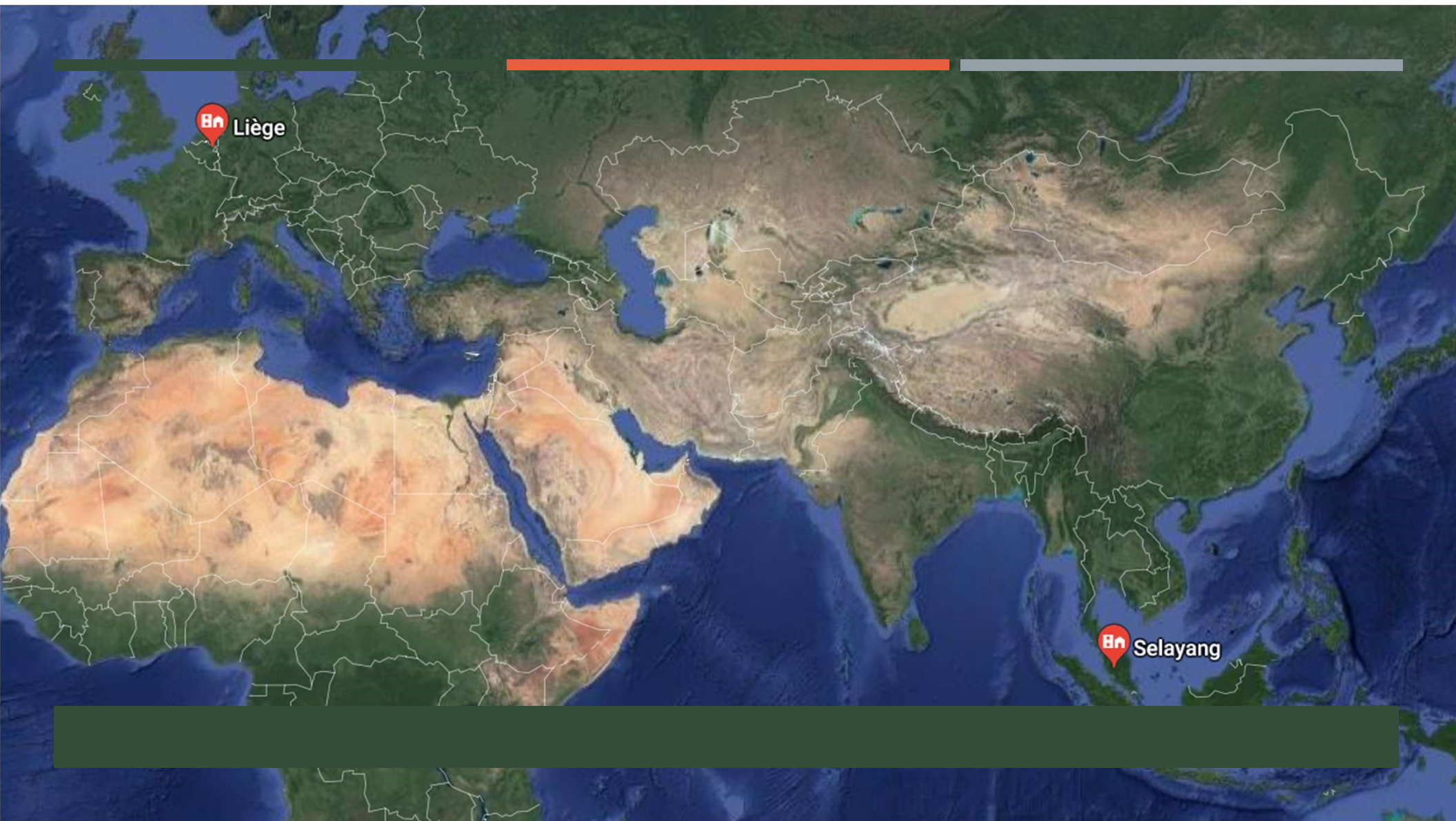




ORTHANC AS PACS: A MALAYSIAN EXPERIENCE OF DEPLOYMENT WITHOUT FUNDING

KIM-ANN GIT, MD MMED CIIP

SELAYANG HOSPITAL, MALAYSIA



A man with dark hair and a frustrated expression, wearing a blue V-neck shirt, is shown against a blue background. The image is framed by a dark blue border. At the top, there are three horizontal bars: a dark blue one on the left, a red one in the middle, and a grey one on the right. At the bottom, there is a solid dark blue bar.

**"Dammit Jim,
I'm a doctor not a
software developer"**



● **download@orthanc-server.com**

To: ftsvd@yahoo.com



13 Feb 2015 at 8:48 am

Thanks for your interest in Orthanc! You can download the requested package at the following location:

<http://www.orthanc-server.com/downloads/package.php?id=sei7naSh>



A tutorial about Orthanc is available at the following location:

<http://www.orthanc-server.com/resources/2015-02-09-emsy-tutorial/index.html>

Further instructions can be found on the official website:

<http://www.orthanc-server.com/resources.php>

As a reminder, here is the content of your download request:

Version: Orthanc-0.8.6-Installer.exe

First name: Kim Ann

Last name: Git(MyLastNameOnly3Chars)

E-mail: ftsvd@yahoo.com

Company: Hospital Selayang

Sector: Large hospital (> 50 beds)

Other sector:

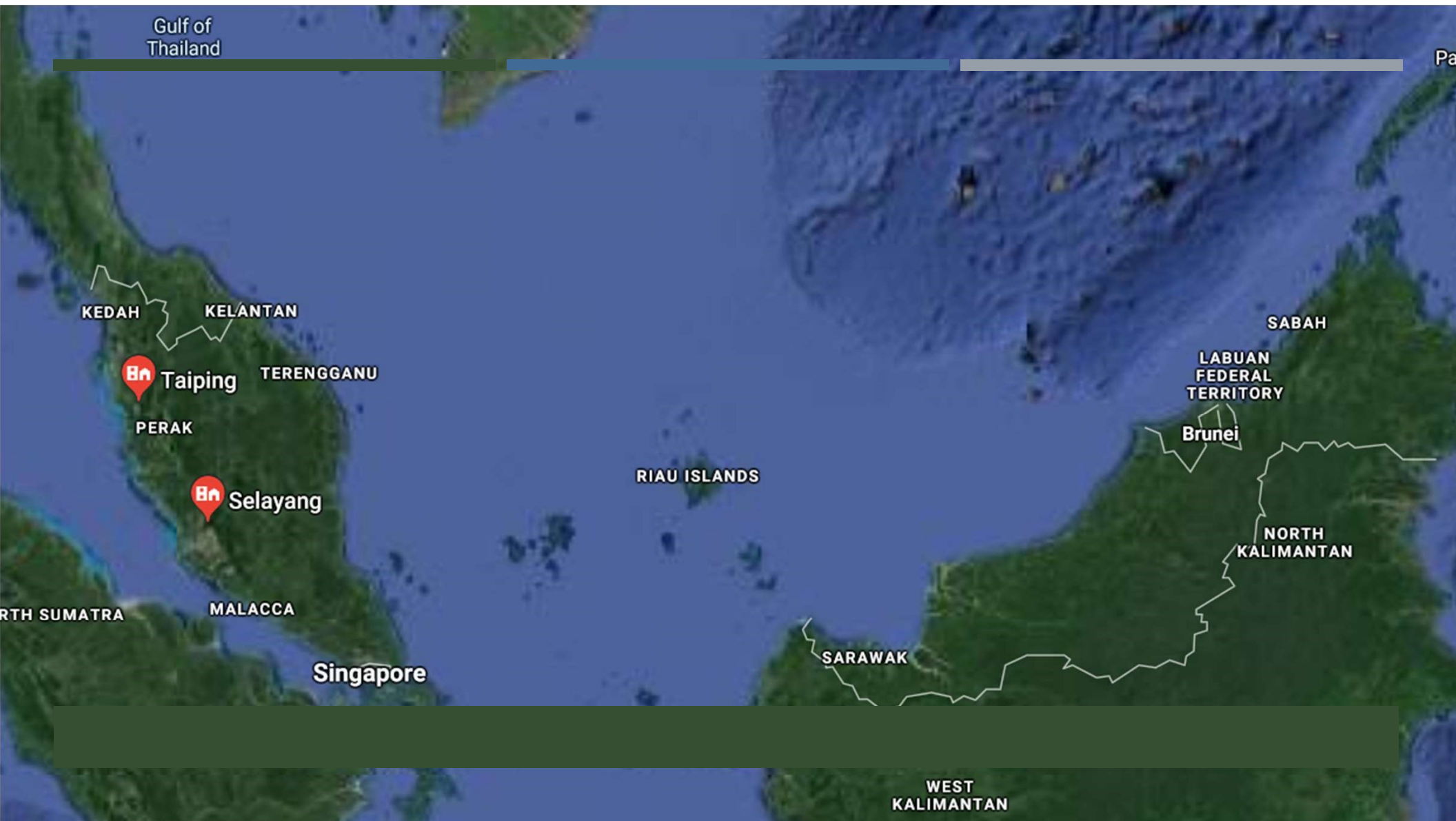
Country: Malay

Address:

Lebuhraya Selayang-Kepong

68100 Batu Caves Selangor







TAIPING HOSPITAL

Established 1880

Beds: 608

First X-ray in 1897

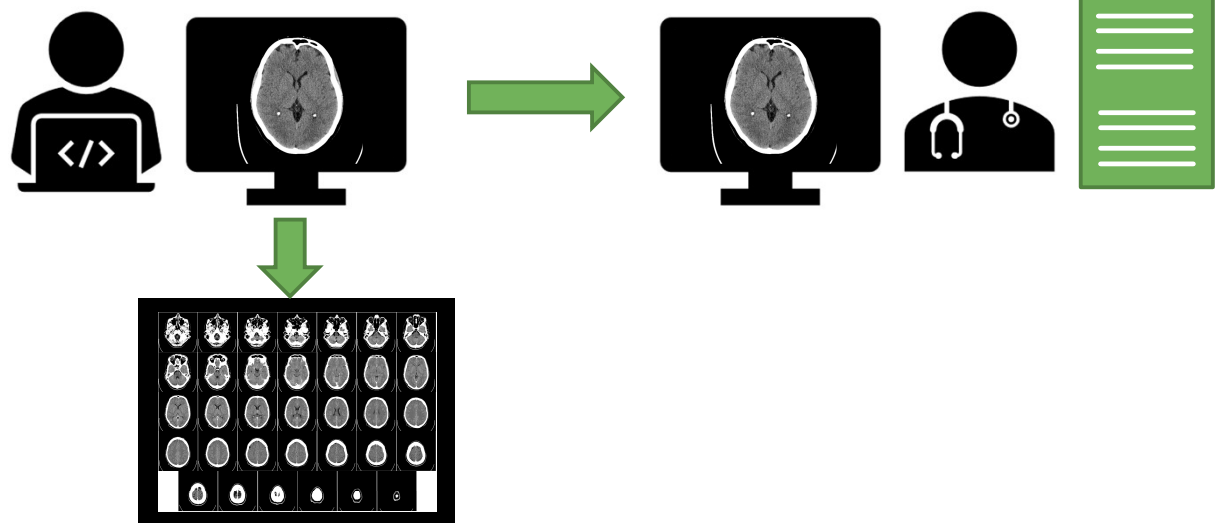
CR / US / MG / CT / MR / RF

A LONG, LONG TIME AGO

Clinics / Wards



Radiology Department

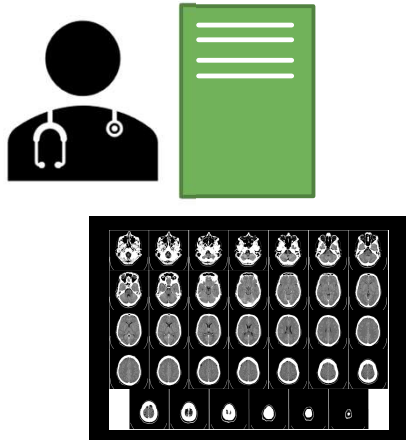


JUST ANOTHER DAY IN THE ORTHOPAEDIC CLINIC



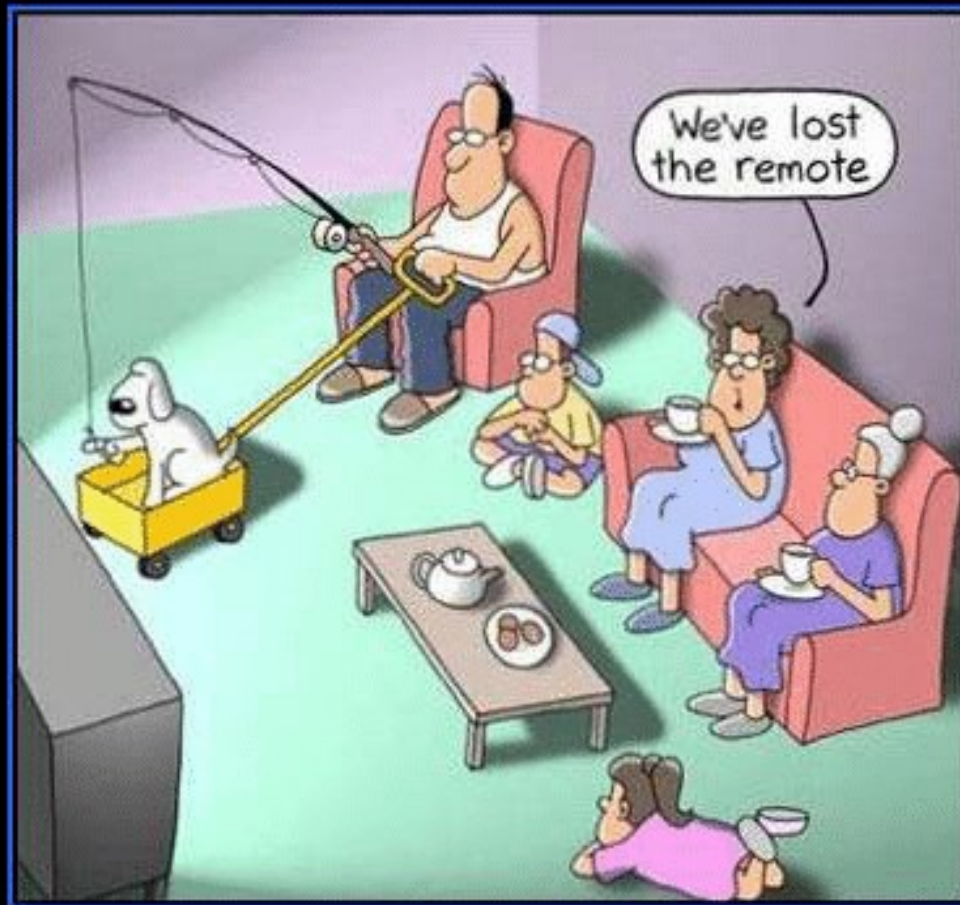
THE COMPLETELY EXPECTED HAPPENS

Clinics / Wards



Radiology Department





NECESSITY

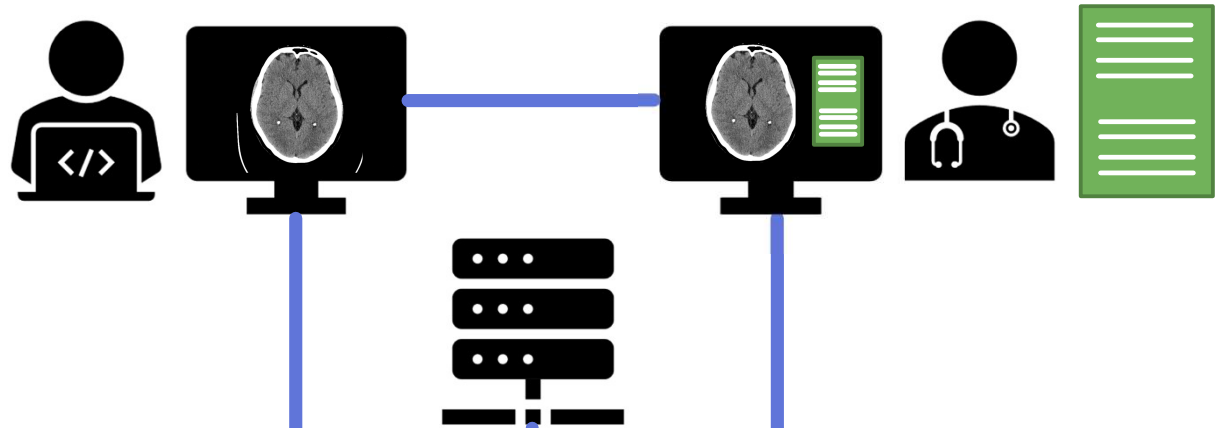
IS THE MOTHER OF INVENTION.

PROJECT MANAGEMENT: SURVEY

Clinics / Wards



Radiology Department

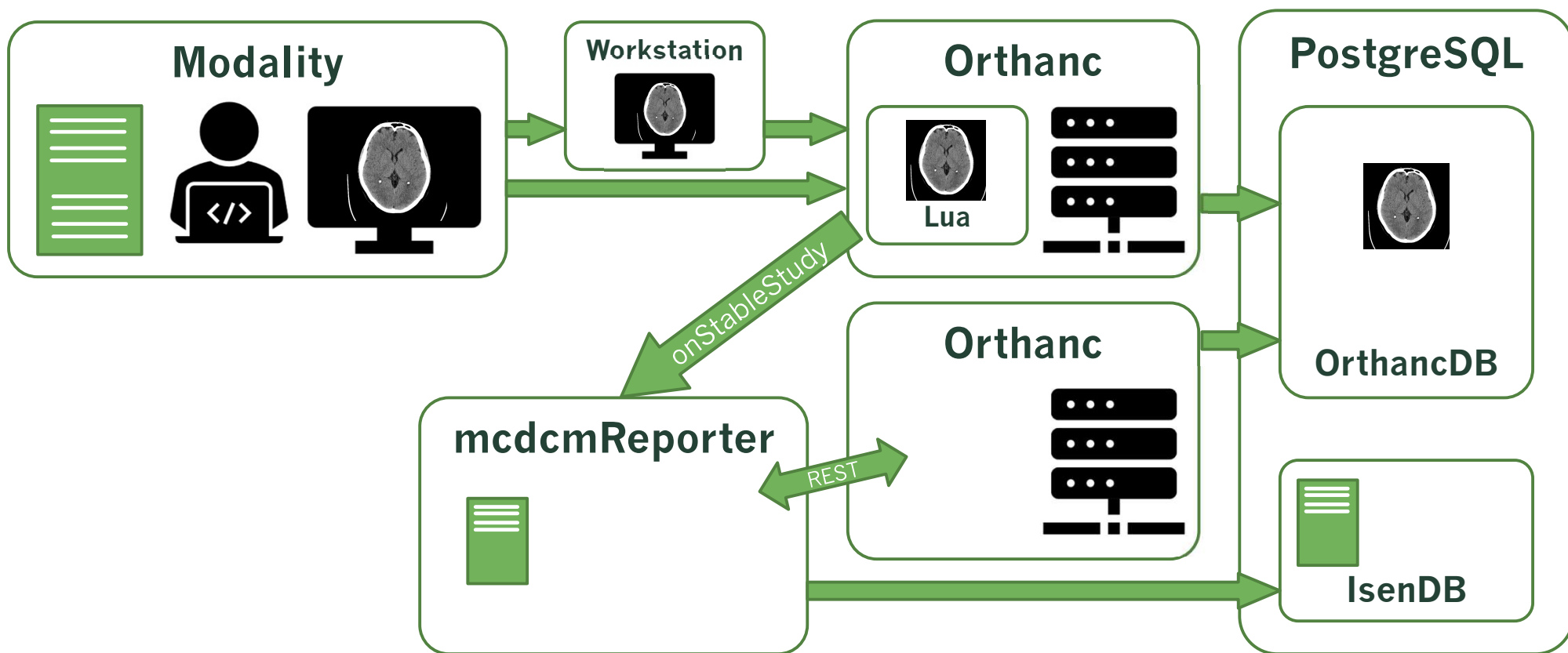


Intranet

OUR DESIGN



OUR DESIGN



medcmreporter

Logged in as haflig | [Administration Portal](#) | [Preferences](#) | [Log Out](#)

Search

Offline

Status:

- ☐ New
- ☐ Draft
- ☐ Final
- ☐ Amended

Modality:

- ☐ CR
- ☐ DX
- ☐ CT
- ☐ MR
- ☐ US
- ☐ MG
- ☐ RF
- ☐ XA

StudyDate:

Search Date: 20191208

Patient Name / ID / IC:

Search

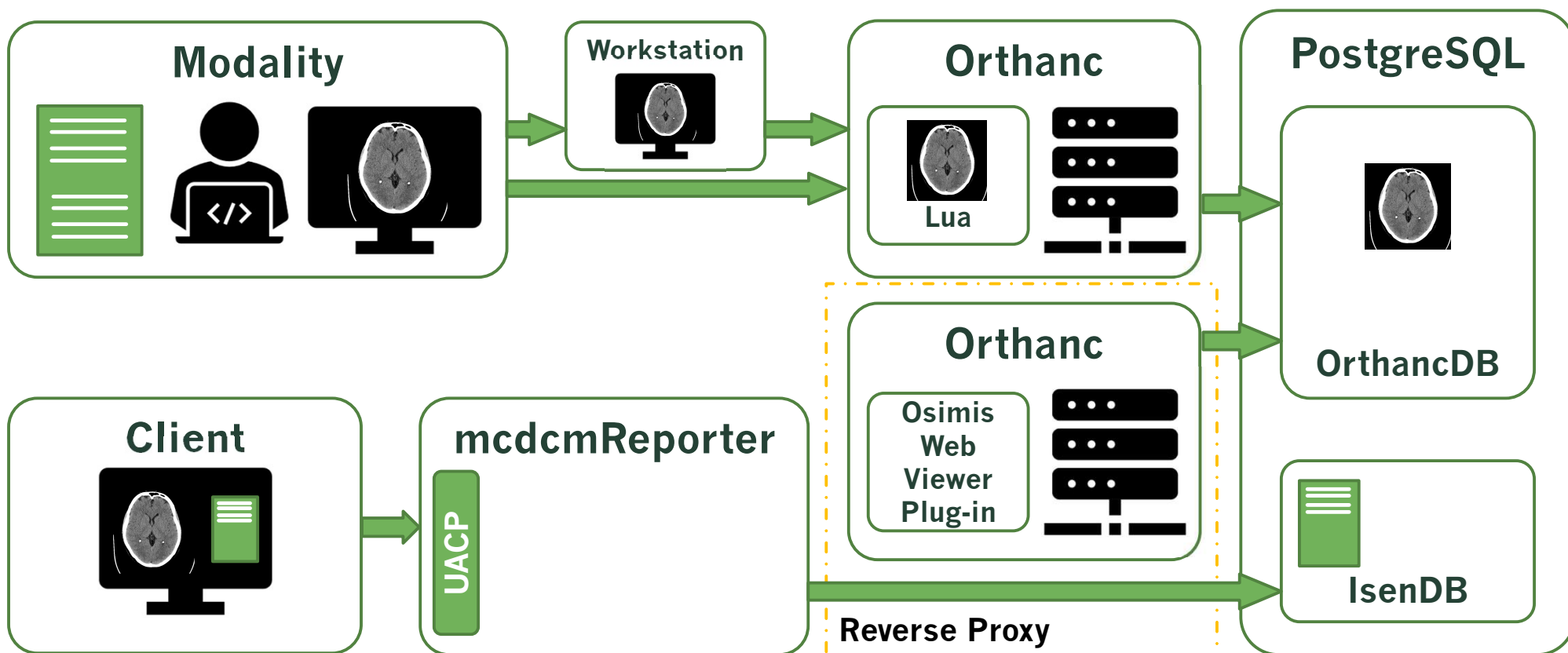
Offline Patient:

Add Report

Total Cases: 107

	MRN	PatientName A V	Sex	Date A V	Time	Mod	Procedure	Acc. No	Status	Reported by	Keywords		Action
1			F	08/12/2019	01:02	CR	Port - CXR	47937	new			X PE PH	
2			M	08/12/2019	02:50	CR	Peds Chest - 1 View	47938	new			X PE PH	
3			M	08/12/2019	03:11	CR	Adult Chest - 1 View	47939	new			X PE PH	
4			M	08/12/2019	03:53	CR	L Spine - 2 Views	47940	new			X PE PH	
5			M	08/12/2019	03:54	CR	Adult Chest - 1 View	47942	new			X PE PH	
6			M	08/12/2019	04:42	CR	No Study Description	47943	new			X PE PH	
7			M	08/12/2019	04:05	CR	Adult Chest - 1 View	47941	new			X PE PH	
8			M	08/12/2019	04:63	CR	No Study Description	47944-49	new			X PE PH	
9			M	08/12/2019	04:92	CT	BRAIN/CT13709-10	13709-10	final	taranjit		X PE PH	
10			M	08/12/2019	05:83	CT	BRAIN/CT13711	13711	final	taranjit		X PE PH	
11			F	08/12/2019	01:03	CR	Abdomen - 1 View - Supine	47951	new			X PE PH	
12			M	08/12/2019	01:12	CR	Knee - 3 Views	47952-53	new			X PE PH	
13			F	08/12/2019	01:49	CR	Abdomen - 1 View - Supine	47955-56	new			X PE PH	
14			M	08/12/2019	01:59	CR	Forearm - 2 Views	47957-58	new			X PE PH	
15			M	08/12/2019	02:07	CR	Foot - 2 Views	47959	new			X PE PH	
16			F	08/12/2019	02:31	CR	Adult Chest - 1 View	47960	new			X PE PH	
17			M	08/12/2019	02:34	CR	Adult Chest - 1 View	47961	new			X PE PH	
18			F	08/12/2019	02:40	CR	Adult Chest - 1 View	47962	new			X PE PH	
19			M	08/12/2019	02:46	CR	Abdomen - 1 View - Supine	47964	new			X PE PH	
20			F	08/12/2019	02:51	CR	Adult Chest - 1 View	47963	new			X PE PH	
21			M	08/12/2019	03:01	CR	Port - CXR	47965	new			X PE PH	
22			M	08/12/2019	03:58	CR	No Study Description	47966	new			X PE PH	
23			M	08/12/2019	05:03	CT	BRAIN/CT13712	13712	final	taranjit		X PE PH	
24			M	08/12/2019	06:05	CR	Chest	14738	new			X PE PH	
25			F	08/12/2019	06:56	CR	No Study Description	47967	new			X PE PH	
26			M	08/12/2019	07:15	CR	No Study Description	47968-69	new			X PE PH	
27			M	08/12/2019	08:23	CR	No Study Description	47971	new			X PE PH	
28			F	08/12/2019	08:25	CR	No Study Description	47972	new			X PE PH	
29			M	08/12/2019	08:31	CR	No Study Description	47973	new			X PE PH	
30			M	08/12/2019	08:36	CR	No Study Description	47974-76	new			X PE PH	

OUR DESIGN



mdcmreporter

Logged in as haffig | [Preferences](#) | [Switch Orientation](#) | [Default: Osiris](#) | [View Report Only](#) | [Log Out](#)

previous final report by tarangit

Current Worklist

Series: Head 5.0 | Open Current Study in Osiris

UNTITLED STUDY [2019/12/08] | Not for diagnostic usage.

Untitled study
2019/12/08



A

20191208
#2 - Head 5.0

R

L

LIP

Zoom: 1.70x
ww/wc: 120/40

49 of 68 | Maximize

Patient Details

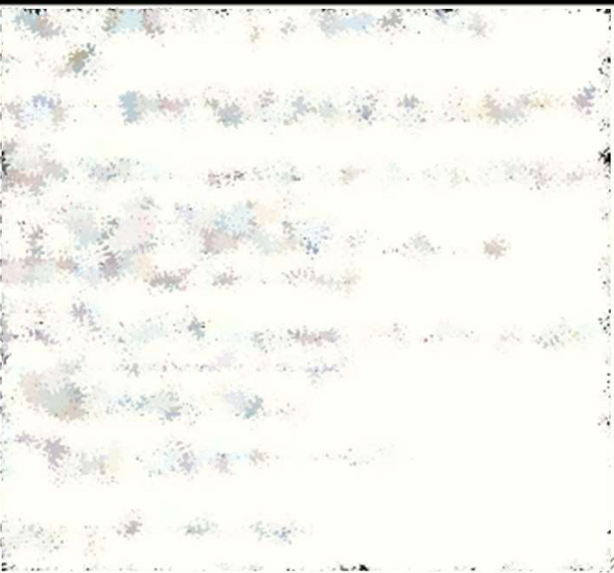
Patient Name: [REDACTED]

Patient ID: [REDACTED]

Study Date: 20191208

Clinical Information

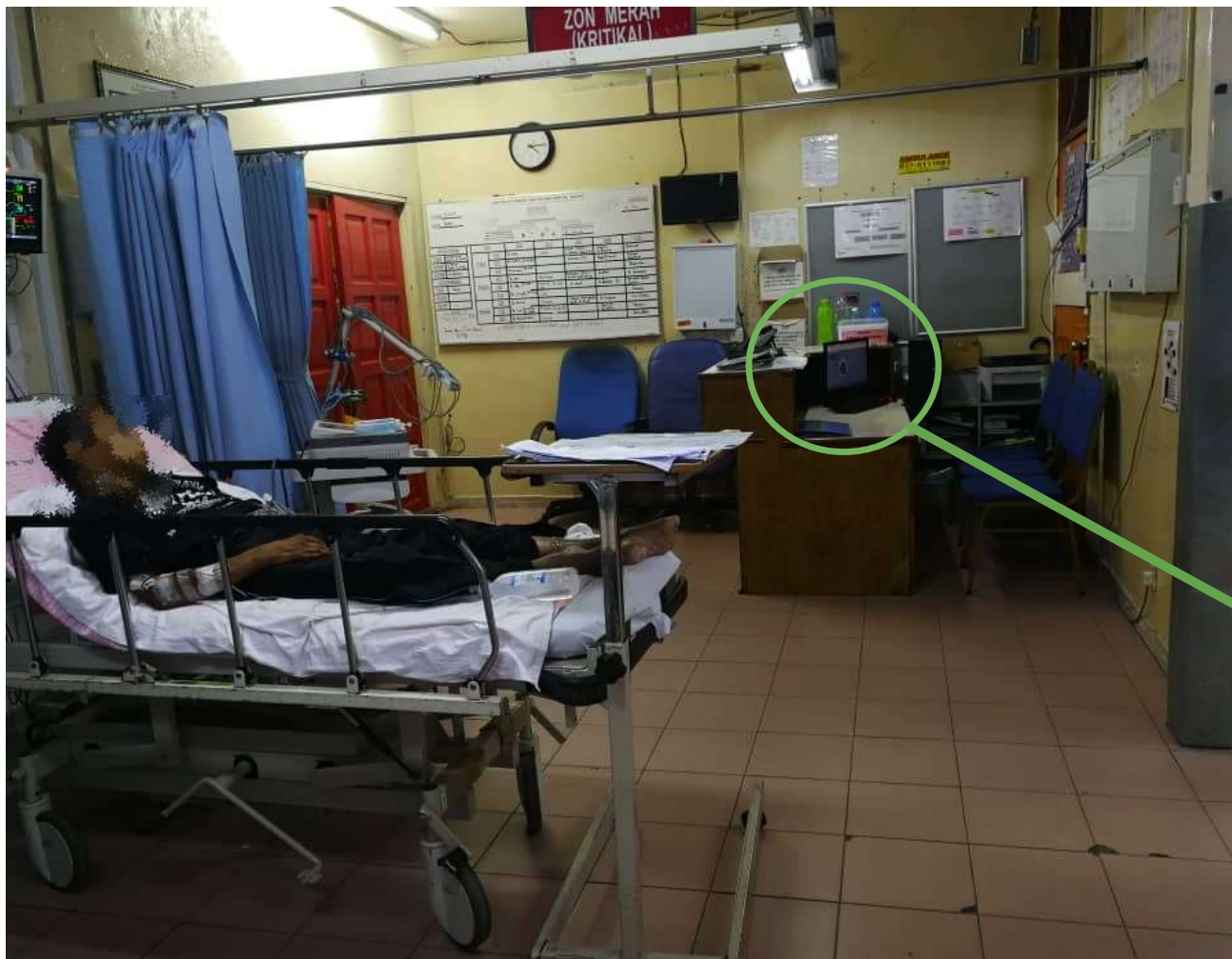
Report: Templates



Current status: final [tarangit] | Amend

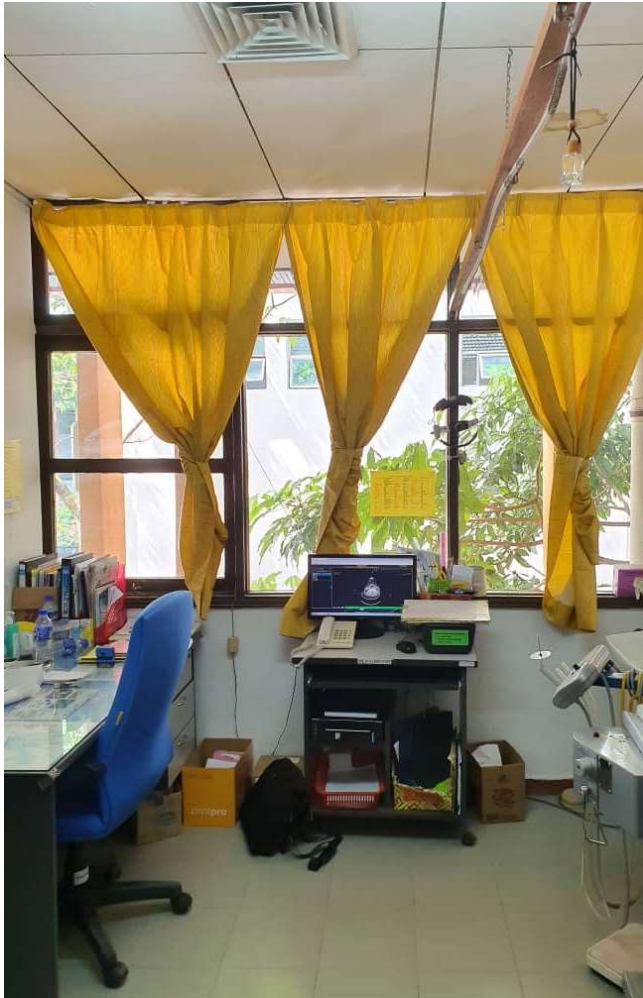
PHOTOS





EMERGENCY DEPARTMENT





ENT CLINIC

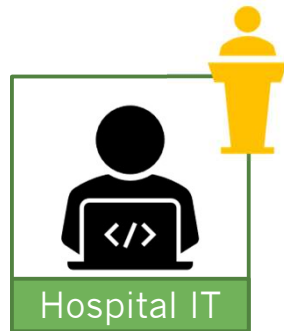
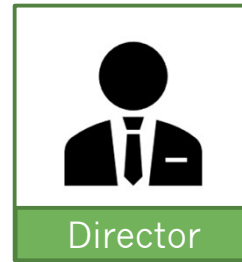
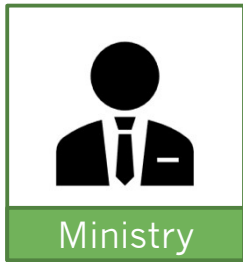


SURGICAL WARD



SURGICAL WARD

CHANGE MANAGEMENT



STATISTICS

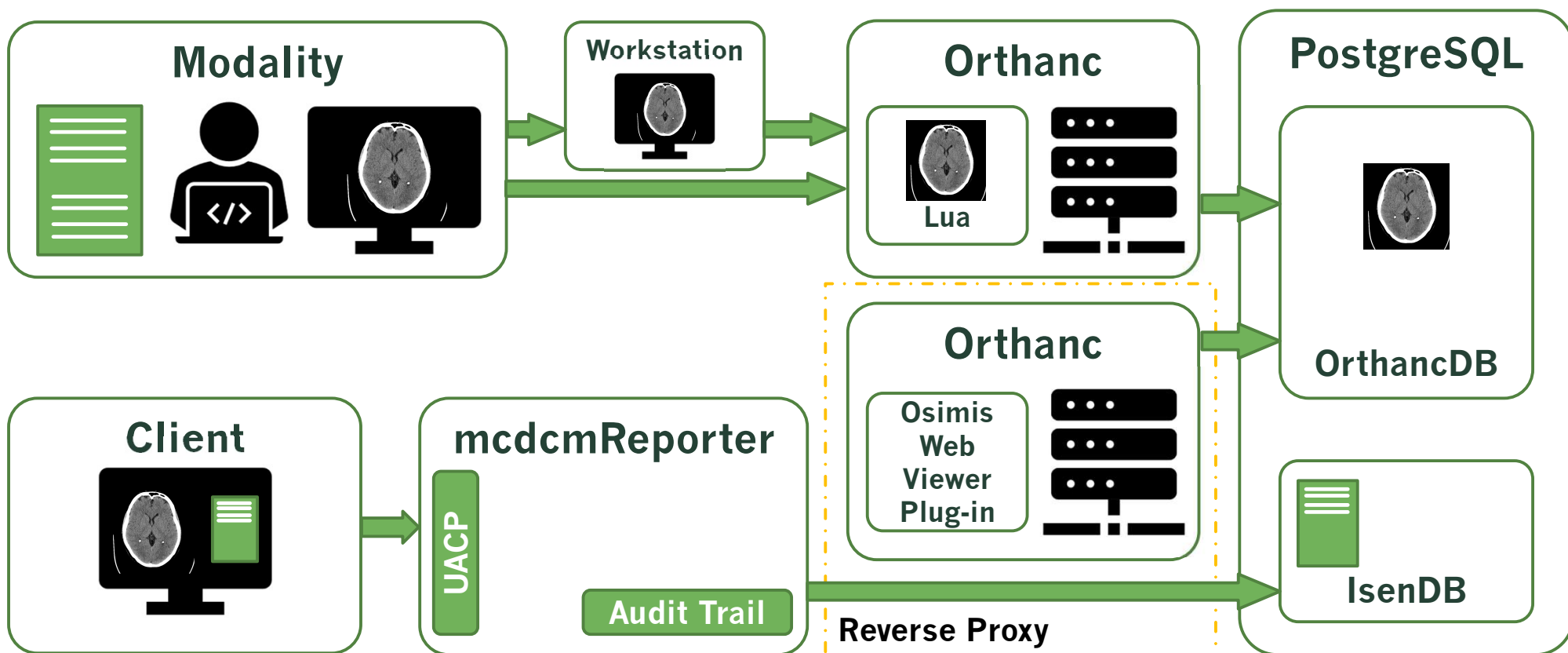


/STATISTICS (8 DEC 2019)

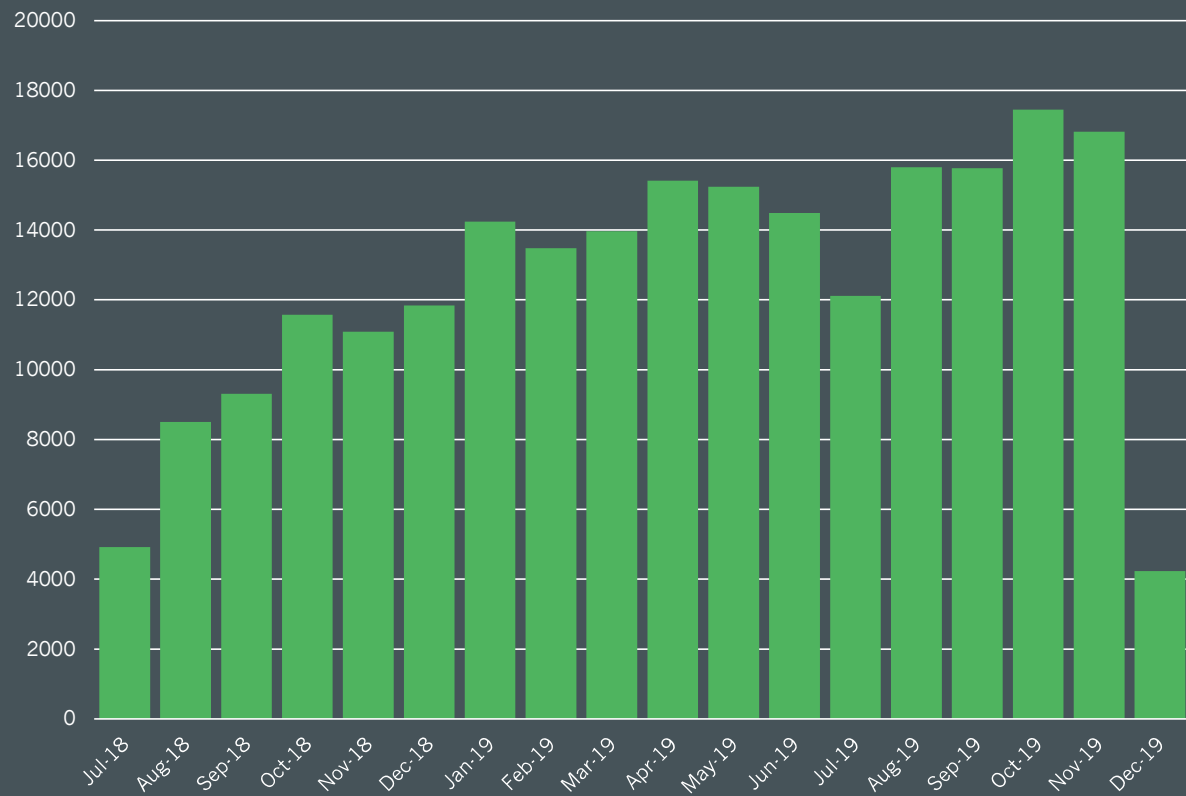
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{  
  "CountInstances" : 2839310,  
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  "CountSeries" : 175558,  
  "CountStudies" : 103679,  
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}
```

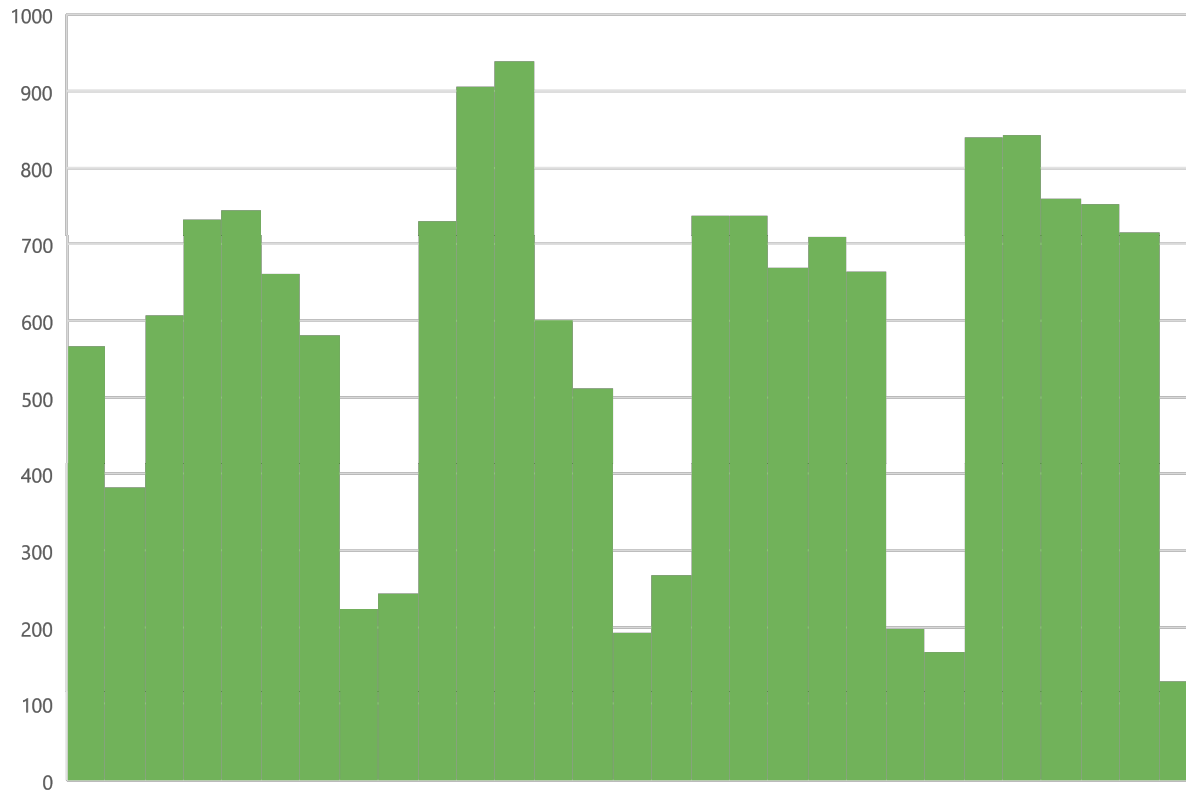
100,000+ studies
2,800,000+ instances
2.8Tb

OUR DESIGN



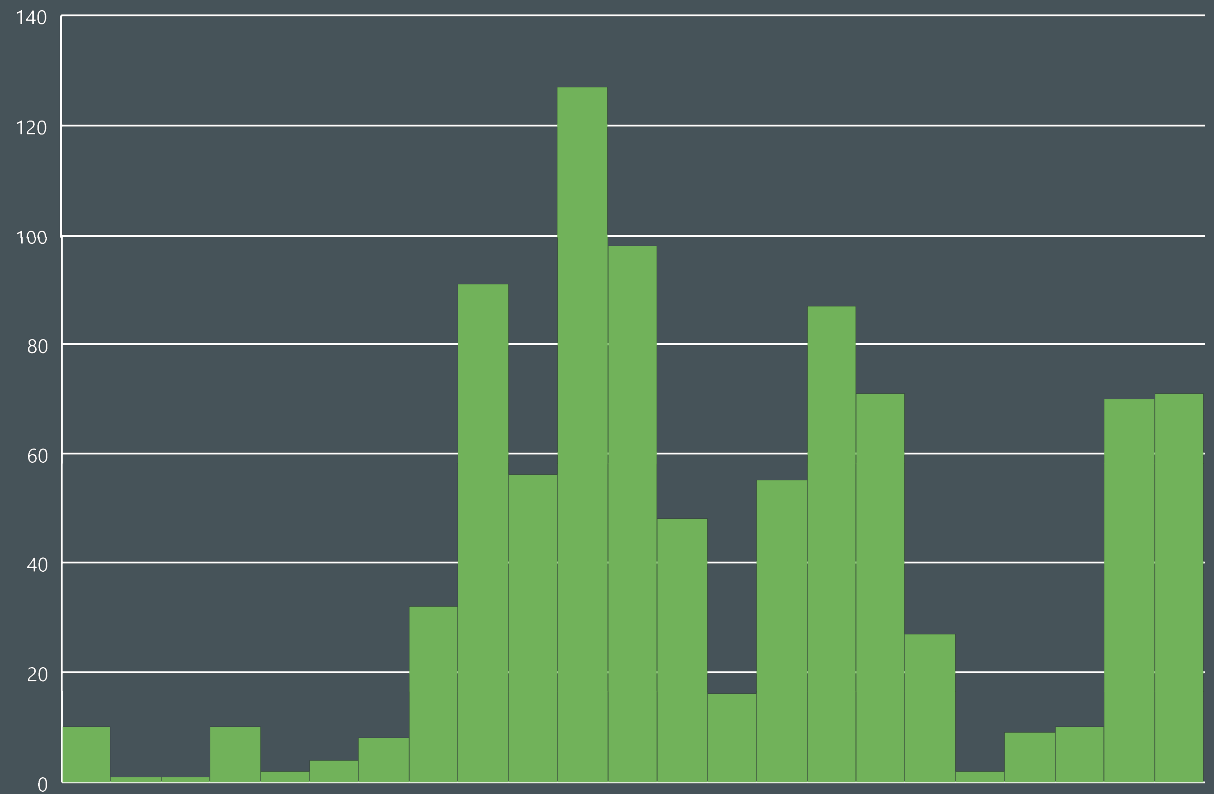
STUDIES VIEWED PER MONTH

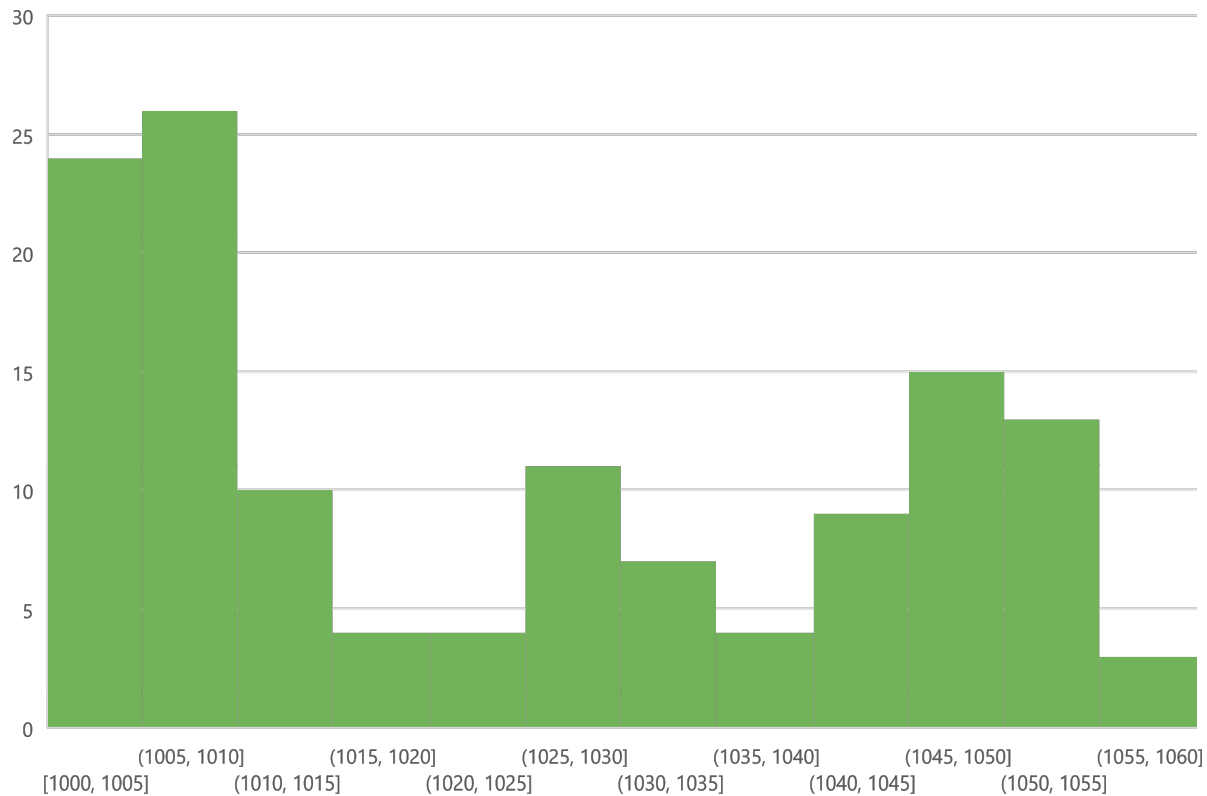




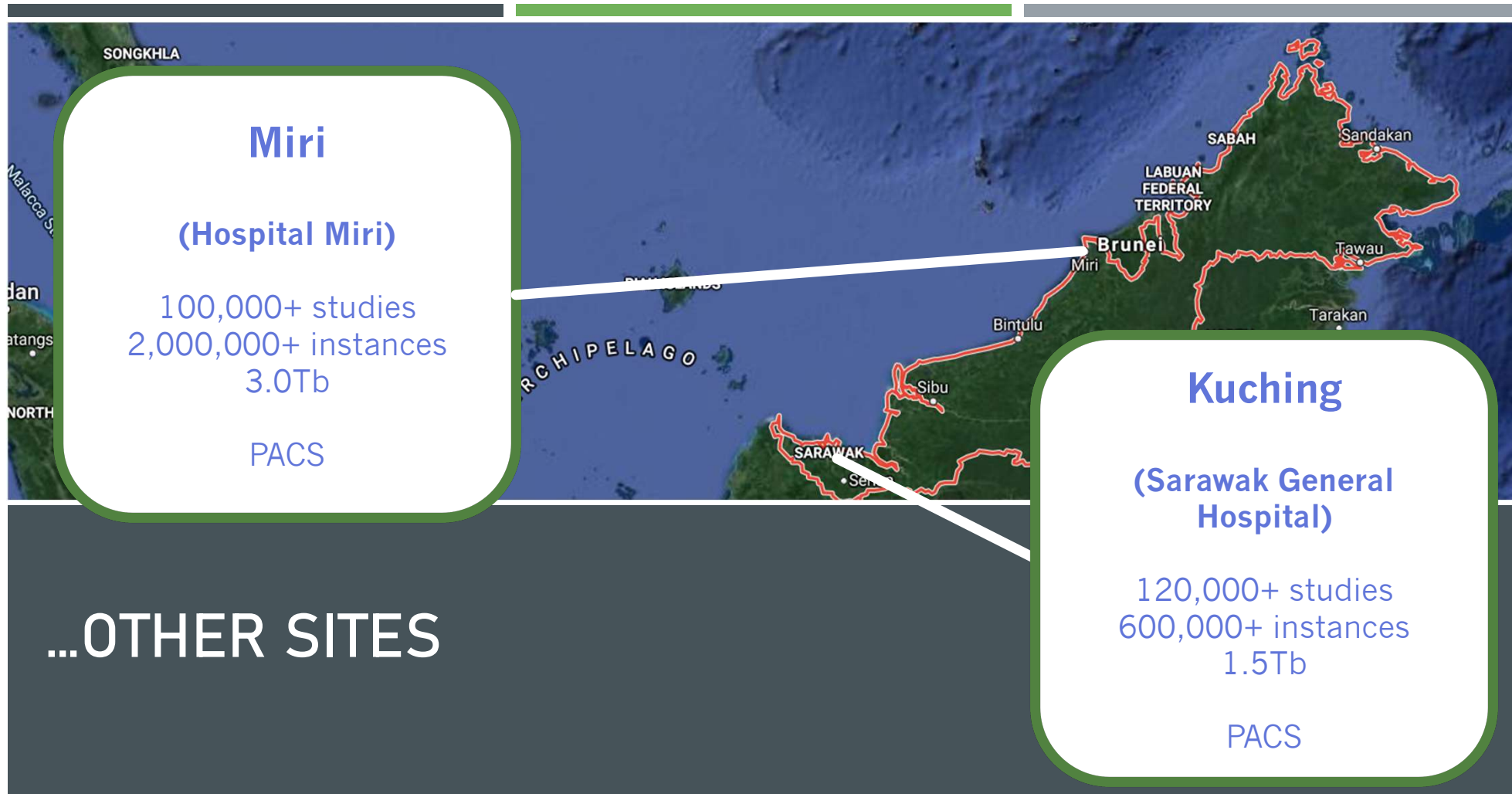
STUDIES
VIEWED
PER DAY
(NOV 2019)

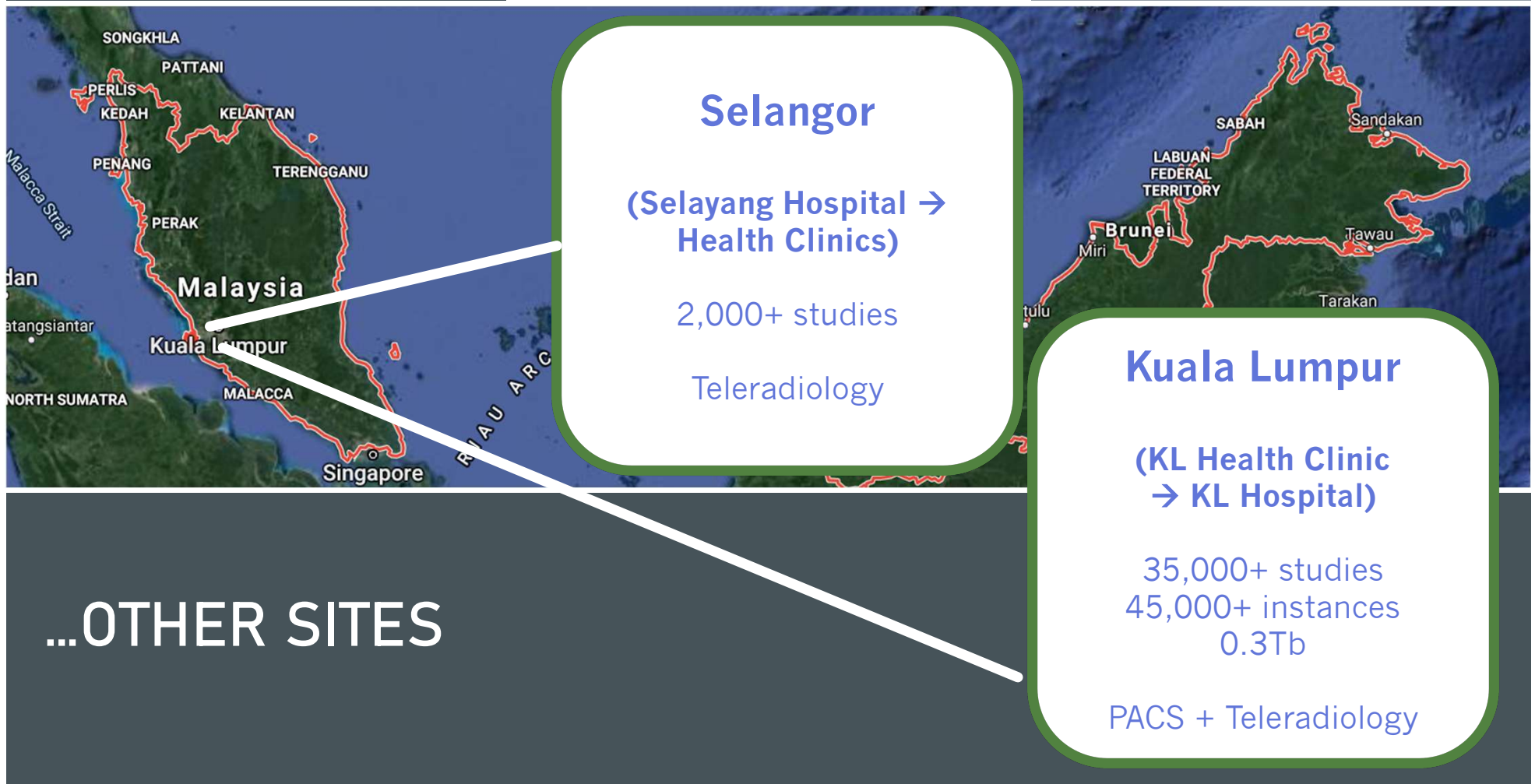
STUDIES VIEWED PER HOUR (12 NOV 2019)





**STUDIES
VIEWED
PER 5-MIN**
(10AM 12 NOV 2019)

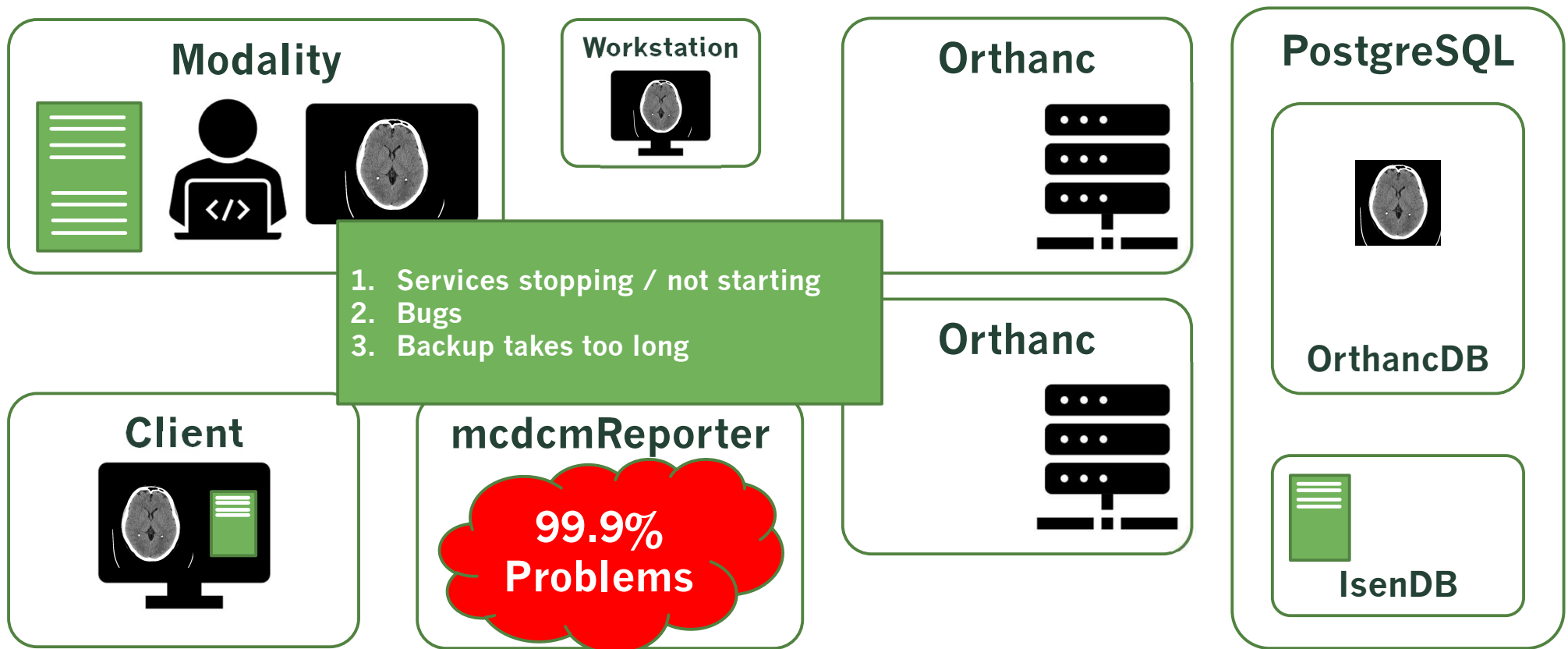




CHALLENGES

A vertical light gray line is positioned to the right of the word "CHALLENGES", extending from the top of the word to the bottom of the word.

CHALLENGE #0: UNQUALIFIED DEV



CHALLENGE #1: INTEGRATION COSTS

Solution 1:

Modify pre-existing nodes as routers or take over deprecated nodes

Modality

Workstation

Orthanc

Solution 2:

Ask a friendly engineer or beg from the vendor

Price Per Connection (IP, Port, AET)

RM7,000 → RM25,000
\$1,600 → \$6,000
€1,500 → €5,000

Solution 3:

Threaten the vendor

CHALLENGE #2: BACKUP

PostgreSQL



OrthancDB



IsenDB

Initial Solution:

Nightly ZIP and COPY the [pgdata] folder to external HDD

Current Solutions:

[pgdata] on RAID5

Nightly DSYNCHRONIZE [pgdata] with external HDD

[HELP!]



CHALLENGE #3: I CAN HAZ IT?

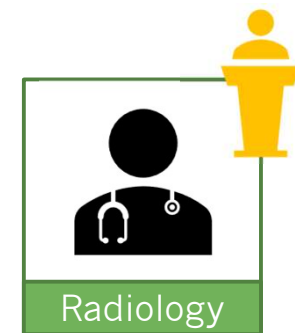
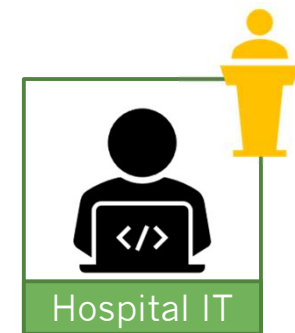


Future Direction:

Containers

CHALLENGE #4: MAINTENANCE

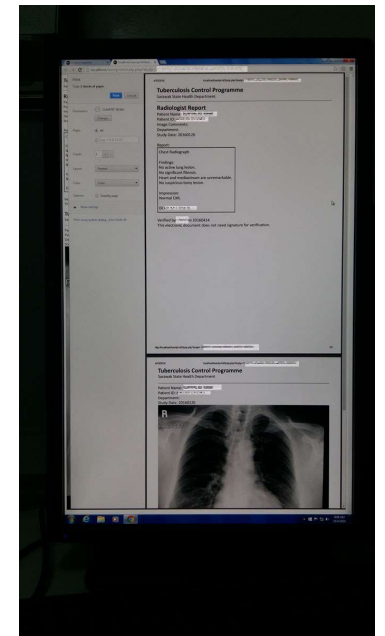
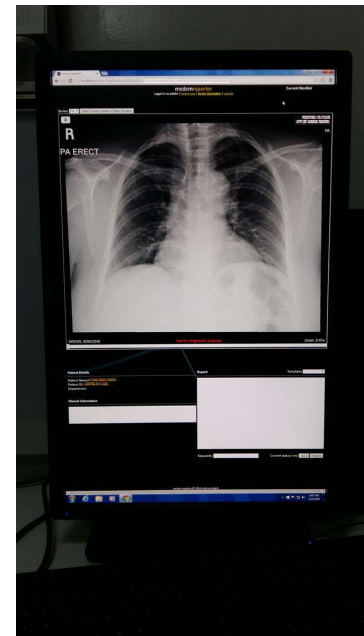
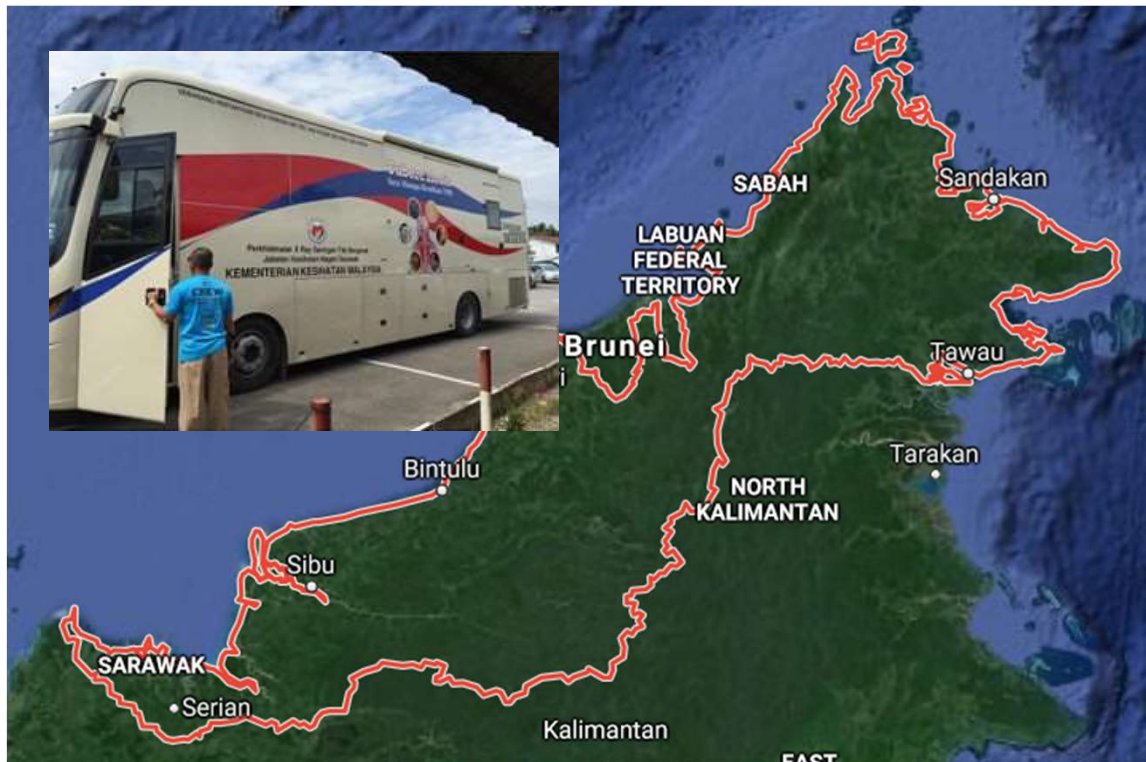
Name	Status	100% CPU	92% Memory
Lightweight, RESTful DICOM server for medical ...		12.9%	588.1 MB
Windows PowerShell		10.4%	58.1 MB
Windows PowerShell		8.3%	9.0 MB
Windows PowerShell		8.0%	8.9 MB
Windows PowerShell		7.9%	9.1 MB
Windows PowerShell		7.4%	8.9 MB
Windows PowerShell		7.4%	9.0 MB
Windows PowerShell		6.6%	9.0 MB
Windows PowerShell		6.6%	9.0 MB
Windows PowerShell		6.5%	9.1 MB
Windows PowerShell		5.6%	9.0 MB
Windows PowerShell		5.5%	13.0 MB
Windows PowerShell		1.2%	35.4 MB



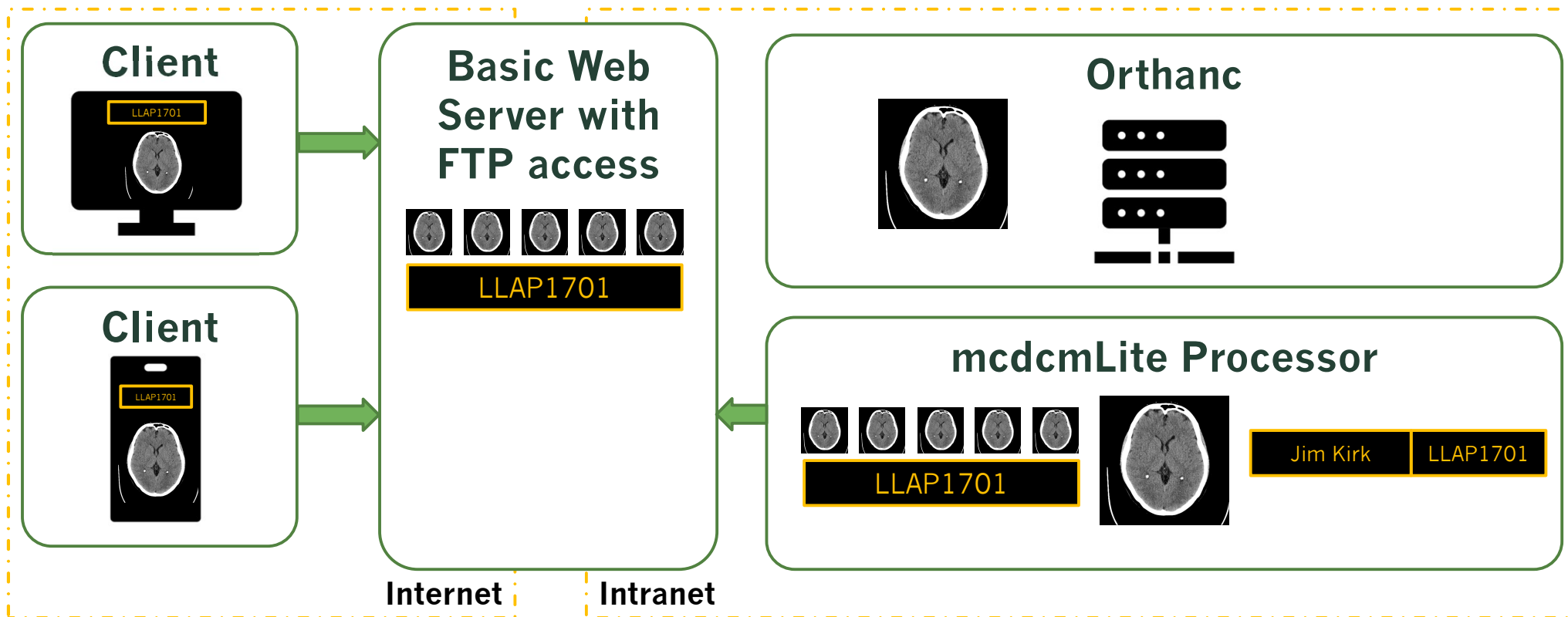
EXTRA STUFF

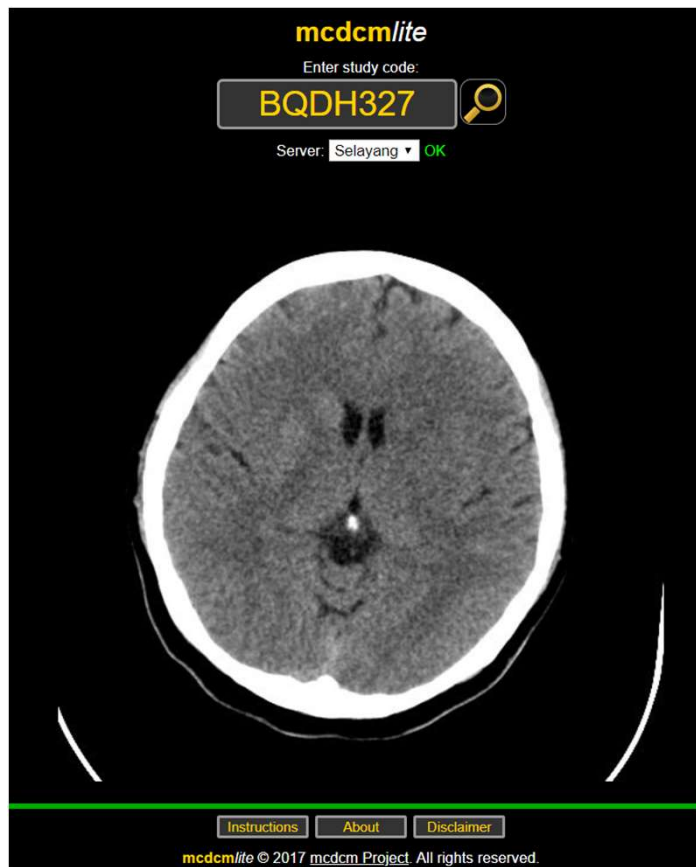


#1: THE ORIGINAL MCDCMREPORTER



#2: MOBILE VIEWING





Internet

mcdcmLite					
Study List Last 3 days Display All					
Patient Name	Patient MRN	Study	Date	Time	Code
[Blurred Patient Name]	[Blurred MRN]	Head 1_HeadRoutine (Adult)	04/12/2019	0934	BQDH327 Regenerate
[Blurred Patient Name]	[Blurred MRN]	Head 1_HeadRoutine (Adult)	04/12/2019	0826	YBJV831 Regenerate
[Blurred Patient Name]	[Blurred MRN]	Head 1_HeadRoutine (Adult)	04/12/2019	0225	EKPH851 Regenerate
[Blurred Patient Name]	[Blurred MRN]	Head 1_HeadRoutine (Adult)	04/12/2019	0212	AMKY880 Regenerate
[Blurred Patient Name]	[Blurred MRN]	Head 1_HeadRoutine (Adult)	04/12/2019	0029	VZXJ333 Regenerate
[Blurred Patient Name]	[Blurred MRN]	Head 1_HeadRoutine (Adult)	03/12/2019	2211	EXEW189 Regenerate

Intranet

#3: CT DOSE DATABASE

← → C 10.2.40.113/dose/index.php?sortby=tdlp&filter=20150408

Patient CT Dose Monitoring
Hospital Selayang

Filter by 20150408 | Sort by Study Date | Patient Name | Patient Age | Study Description | Total DLP
Sorted by: tdlp Filtered by: 20150408

	MRN	PatientName	Age	Sex	Date	Time	Procedure	TotalDLP	Dose (mSv)
1			032Y	F	08-04-2015	1530	Abdomen*1_KUBAbdomen30percentDoseReduction (Adult)	192	2.9
2			033Y	M	08-04-2015	0827	Abdomen*1_KUBAbdomen30percentDoseReduction (Adult)	247	3.7
3			063Y	F	08-04-2015	0837	Thorax*1_ThoraxRoutine (Adult)	325	4.6
4			045Y	M	08-04-2015	1111	Neck*1_NeckRoutine (Adult)	327	1.9
5			043Y	M	08-04-2015	0751	Abdomen*1_KUBAbdomen30percentDoseReduction (Adult)	368	5.5
6			056Y	M	08-04-2015	0932	Abdomen*1_KUBAbdomen30percentDoseReduction (Adult)	415	6.2
7			067Y	M	08-04-2015	1310	Abdomen*1_KUBAbdomen30percentDoseReduction (Adult)	425	6.4
8			065Y	F	08-04-2015	1544	Abdomen*1_AbdomenPelvisPlain (Adult)	514	7.7
9			069Y	F	08-04-2015	1748	Abdomen*1_AbdomenPelvis (Adult)	592	8.9
10			015Y	F	08-04-2015	2351	Head*1_HeadRoutine (Child)	642	1.3
11			068Y	F	08-04-2015	0916	Abdomen*1_CareBoluAbdMultiPhase (Adult)	695	10.4
12			046Y	F	08-04-2015	1838	Head*1_HeadRoutine (Adult)	724	1.5
13			075Y	M	08-04-2015	1218	Abdomen*1_CareBoluAbdMultiPhase (Adult)	732	11.0
14			051Y	M	08-04-2015	2357	Head*1_HeadRoutine (Adult)	761	1.6
15			064Y	M	08-04-2015	0034	Head*1_HeadRoutine (Adult)	783	1.6
16			084Y	F	08-04-2015	1833	Head*1_HeadRoutine (Adult)	787	1.7
17			054Y	M	08-04-2015	1029	Abdomen*1_CareBoluAbdMultiPhase (Adult)	807	12.1
18			073Y	M	08-04-2015	0856	Abdomen*1_CareBoluAbdMultiPhase (Adult)	830	12.5
19			059Y	F	08-04-2015	1321	Head*1_HeadRoutine (Adult)	833	1.7
20			079Y	M	08-04-2015	2343	Head*1_HeadRoutine (Adult)	905	1.9

IsenDose © 2015 mcdcm project
Powered by Orthanc

Uninterrupted Orthanc service
running 24/7 since April 2015

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  "CountSeries" : 68577,  
  "CountStudies" : 67418,  
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  "TotalDiskSizeMB" : 37529,  
  "TotalUncompressedSize" : "39352035723",  
  "TotalUncompressedSizeMB" : 37529  
}
```




ORTHANC AS PACS: A MALAYSIAN EXPERIENCE OF DEPLOYMENT WITHOUT FUNDING

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