



# Healthcare Asset Management

using 5-S methodology and  
using data analytics

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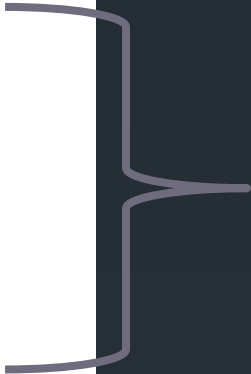
- Health Technology management in any remote hospital is a challenge due to the geographical constraints and poor internet connectivity.
- Along with Lean Six Sigma based 5-S methodology, a data-visualization tool was used in maintaining CT Scanner.

Palau 2013-15 PACTAM Program



CT Scanner in operation

```
2013_03_08 10_18_56 opened new Error Info File. Old file renamed to D:\Data_CanTrace\Backup 2013_03_08
2013/03/08 10:18:56 CanTraceServer Has Been Started
2013/03/08 10:18:56 Creating New CanTrace Database file
2013/03/08 10:22:57 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:00 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:03 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:06 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:09 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:12 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:15 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:24 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:27 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:30 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:33 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:36 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:39 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:42 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:51 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:54 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:23:57 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:24:00 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:24:03 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:24:06 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:24:09 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:37:20 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 10:38:03 Error: A general exception occurred in CCanTraceSrvr::OnGotMsgFromCAN()
2013/03/08 18:47:52 CanTraceServer Has Been Started
```



One Minute  
of CT  
Gantry  
running



- All sensor data generated from the Gantry Host Computer is logged and is available for analysis.
- Thousands of lines of log have few errors and warnings embedded.
- Frequency of the error/warning message is a good indicator.

We built a Shiny R application to do the text analytics:

<https://hiremaths.shinyapps.io/assetCheck>

Shiny R application



## Most Frequent Errors

Choose a time stamp:

2013\_03\_19 10\_37\_54

Change

Minimum Frequency:



Maximum Number of Words:



error  
general  
exception  
occurred

## Most Frequent Errors

Choose a time stamp:

2013\_03\_20 09\_08\_15

Change

Minimum Frequency:

1 15 50

1 6 11 16 21 26 31 36 41 46 50

Maximum Number of Words:

1 100 300

1 31 61 91 121 151 181 211 241 271 300

Select the time stamp of the log file to be displayed


... and click Change



Visualization of the log file text content changes according to the selection.

For example in this case the hard-drive had issues.



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- Visualization of log files allowed quick diagnosis of required maintenance needs.
  - CT Scanner was maintained by replacing the hard-drives in time, before the system experienced a more catastrophic failure.

Thank You ...