



GRID
PROTECTION
ALLIANCE



Reporting, Data Quality, & Beyond

One note about Grafana

- Grafana provides a lot of value to users of GPA products for visualization of historical data
- GPA is not attempting to replace the functionality of Grafana through the use of the new UI frameworks or any of this reporting technology
- GPA is working on an updated interface to Grafana to leverage their newer features

Automated daily reports

- Report engine queries 10-second statistic data from STAT historian to compute daily totals per device
- Configurable schedule defines when data is aggregated for the previous day
- Produces PDF reports that can be automatically sent by email or retrieved via openHistorian Manager

Automated daily reports

The screenshot shows the 'openHistorian Manager' web application interface. The title bar indicates the user is logged in as 'GPA\swills'. The main navigation menu includes 'Home', 'Inputs', 'Outputs', 'Actions', 'Metadata', 'Monitoring', 'Reporting', and 'System'. The 'Reporting' section is active, displaying the 'Configure Completeness Report' configuration page.

Manual Report Generation

Report Date (UTC)

Automatic daily reporting is enabled.

Reporting Services Configuration


Report location should be a path on the server, relative to the service installation path or a fully qualified absolute path, where the service will be able to save the reports. Service user will need rights to this folder.

Report Location Reports >>

Reports expire after 14 days >> days

Daily Report Generation Time 02:00 >> (HH:mm)

Available Reports

Date	Status
 10/21/2024	Expires in 14 days

Pending Reports

Date

Automated daily reports - Completeness

- Completeness is defined by the ratio between measurements received and measurements expected
- Configurable thresholds define levels into which devices can be categorized, to highlight good and bad performers
- 10-second statistics aggregated to daily totals per device
 - Measurements received: DEVICE!PMU-ST4
 - Measurements expected: DEVICE!PMU-ST5
- Breakdown includes additional statistics
 - Data errors: DEVICE!PMU-ST1
 - Time errors: DEVICE!PMU-ST2

Automated daily reports - Completeness

openPDC Completeness Report

Grid Protection Alliance

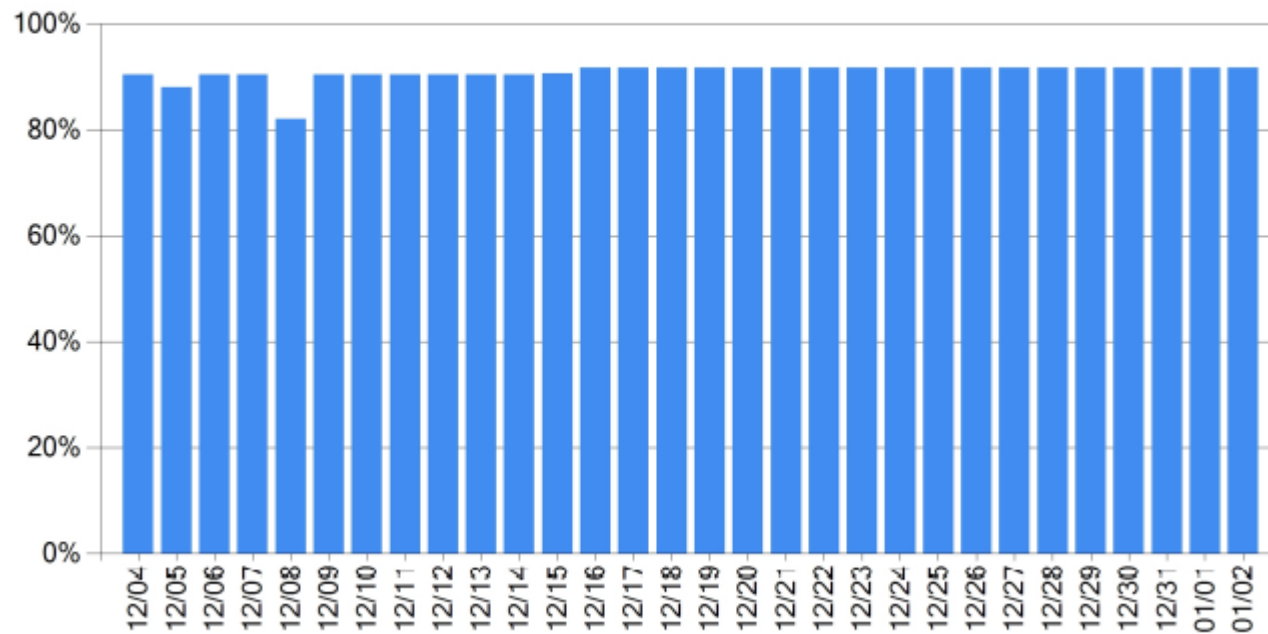
Monday, 02 January 2017

5-day Device Data Completeness

	12/29	12/30	12/31	01/01	01/02
L4: Good	77	67	61	75	2
L3: Fair	1	11	17	3	76
L2: Poor	0	0	0	0	0
L1: Offline	0	0	0	0	0
L0: Failed	7	7	7	7	7
Total	85	85	85	85	85

Automated daily reports - Completeness

Percent of Devices with Acceptable Quality (30 days)

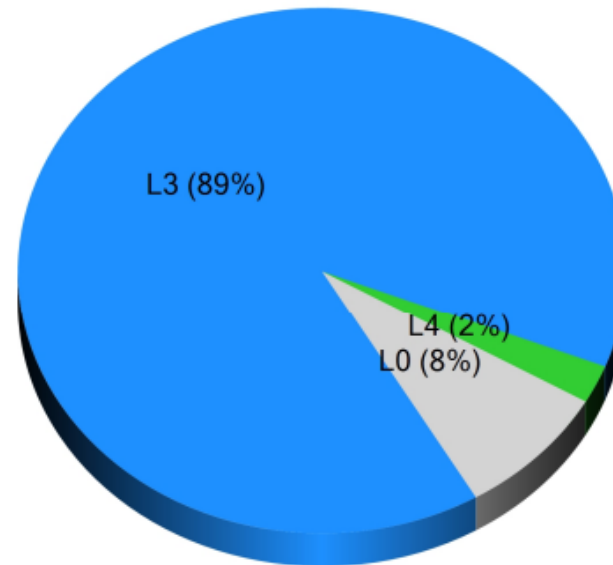


Automated daily reports - Completeness

Monday, 02 January 2017

Data Completeness Breakdown

Level 4	2
Level 3	76
Level 2	0
Level 1	0
Level 0	7



Automated daily reports - Completeness

Level 2

Name	Completeness	Data Errors	Time Errors
PDC!CIBRISTERS_11-1L1	84.59%	0	0
PDC!C!L!DOOMS	1.15%	0	0
PDC!C!LADYSMITH_11-1L6	53.35%	0	0
PDC!C!MORRISVIL_11-1T1	24.94%	0	0
PDC!C!NANNA500_11-1PMU	22.04%	0	0

Level 3

Name	Completeness	Data Errors	Time Errors
PDC!CIBRISTERS_11-1L3	95.48%	0	0
PDC!CIBRISTERS_11-1PMU	96.28%	0	0
PDC!C!CARSON_11-1L1	96.21%	0	0
PDC!C!CARSON_11-1L2	97.15%	0	0
PDC!C!CARSON_11-1L4	97.41%	0	0
PDC!C!CARSON_11-1L5	97.59%	0	0
PDC!C!CARSON_11-1PMU	98.28%	0	0
PDC!C!CHANCELO_11-1L1	98.18%	0	0
PDC!C!CHANCELO_11-1L2	95.81%	0	0
PDC!C!CHANCELO_11-1T1	97.98%	0	0
PDC!C!CHANCELO_11-1T4	95.07%	0	0

Automated daily reports - Correctness

- Correctness is defined by...
 - Unreasonableness – thresholds for values that are outside the expected range
 - Latched – measurements that repeat the same value more than once
 - Error – measurements received while the upstream device was reporting data errors, time synchronization errors, or device errors
- 10-second statistics aggregated to daily totals per device
 - Measurements received: DEVICE!PMU-ST4
 - Measurements with error: DEVICE!PMU-ST6
 - Data errors: DEVICE!PMU-ST1
 - Time errors: DEVICE!PMU-ST2
 - Device errors: DEVICE!PMU-ST3

Automated daily reports - Correctness

- To detect unreasonable and latched data requires additional alarm configuration
- Configuring these alarms automatically adds point statistics used for reporting
- 10-second alarm statistics aggregated to daily totals per device
 - Alarms with severity Unreasonable: 900!DEVICE-PM1!PT-ST1
 - Alarms with severity Latched: 980!DEVICE-FQ!PT-ST2

Automated daily reports - Correctness

openHistorian Manager - GPA\swills

openHistorian Manager

Current Node: Default

Home Inputs Outputs Actions Metadata Monitoring Reporting System

Manage Alarm Configuration

Tag Name * AL-EXEMPT:TVA_TESTDEVICE-BUS1:ABBV

Signal * TVA_TESTDEVICE-BUS1:ABBV ...

Operation Greater than Alarm Point 2500000

Tolerance

Delay 0 seconds Hysteresis 0

Description Unreasonably high voltage (>2500 kV) Severity None

Load Order * 0

+ Add New Save

TagName	Operation	Severity
0	>	>>

Page Size: 15

Automated daily reports - Correctness

openHistorian Manager - GPA\swills

openHistorian Manager

Current Node: Default

Home Inputs Outputs Actions Metadata Monitoring Reporting System

Manage Alarm Configuration

Tag Name * AL-EXEMPT:TVA_TESTDEVICE:ABBF

Signal * TVA_TESTDEVICE:ABBF

Operation Latched Alarm Point

Tolerance

Delay 0.2 seconds Hysteresis

Description Latched frequency value Severity None

Load Order * 0

+ Add New Save

TagName	Operation	Severity

Page Size: 15

0 > >>

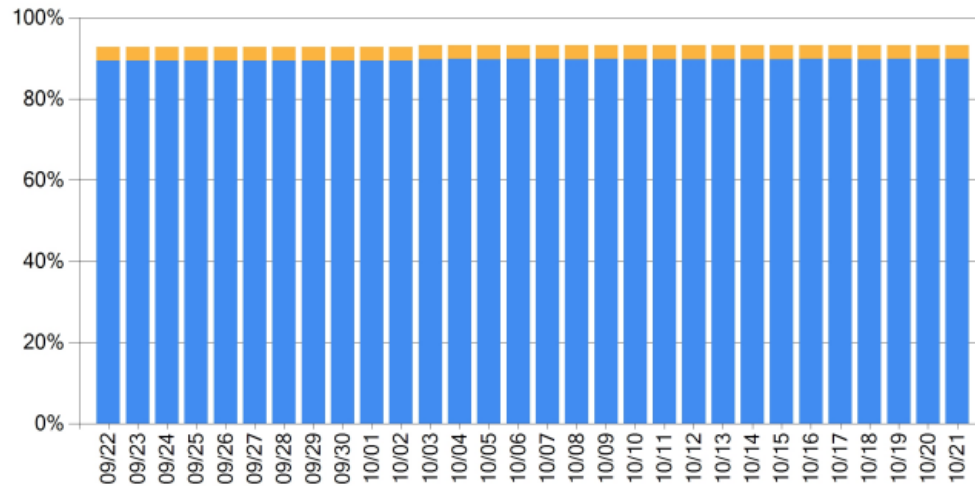
Enabled

Automated daily reports - Correctness

5-day Correctness Summary

	10/17	10/18	10/19	10/20	10/21
Good	89.91%	89.88%	89.90%	89.89%	89.90%
Latched	1.84%	1.84%	1.84%	1.84%	1.83%
Unreasonable	1.57%	1.57%	1.57%	1.57%	1.57%

30-day Correctness Overview



Automated daily reports - Correctness

Data Correctness Breakdown

Name	Correctness		
PDC!C!LIFENTRESS	75.53%		
Name	Latched	Unreasonable	Total
PDC!C!LIFENTRESS-PM1	2,402,734	0	2,402,734
Name	Correctness		
PDC!C!CARSON_11-1L5	84.16%		
Name	Latched	Unreasonable	Total
PDC!C!CARSON_11-1L5-PM2	2,207,398	1,555,426	3,762,824
PDC!C!CARSON_11-1L5-PM5	2,509,087	0	2,509,087
Name	Correctness		
PDC!C!ELMONT_11-1L12	83.02%		
Name	Latched	Unreasonable	Total
PDC!C!ELMONT_11-1L12-FQ	0	2,283,388	2,283,388
PDC!C!ELMONT_11-1L12-PM4	1,809,336	0	1,809,336
PDC!C!ELMONT_11-1L12-PM1	1,578,708	0	1,578,708

openHistorian EE report builder

- Flexibility – Widget-based design to customize the way you visualize your data
- Direct user interaction – Adjustable time range
- Usability – User interface for ease of configuration
- Export to PDF

Widget configuration (pi chart levels)

Configure Pi Chart

Levels Condition

Label	Color	Threshold (%)
Level 1	Green	95
Level 2	Yellow	80
Level 3	Red	2

Save Cancel

Reports

Search Name

Found 5 Report(s)

Name	Default Range
Report1	120
Report2	5
Report3	12
Report4	1
Report5	2

Settings

Edit Mode

Settings

This Hour Today This Week
Last Hour Yesterday Last Week
Last 60 Minutes Last 24 Hours Last 7 Days
This Month This Quarter This Year
Last Month Last Quarter Last Year
Last 30 Days Last 90 Days Last 365 Days

Level 1
Level 2
Level 3

Widget configuration (pi chart condition)

Configure Pi Chart

Levels | Condition

Level	Condition	Value
All	Data Quality	Equal (=) 1
All	Data Quality	Exists 1
Any	Frequency	Greater Than (>) 5

Save Cancel

Previous 1 Next

Reports

Search Name

Found 5 Report(s)

Name	Default Range
Report1	120
Report2	5
Report3	12
Report4	1
Report5	2

Time Filter

This Hour	Today	This Week
Last Hour	Yesterday	Last Week
Last 60 Minutes	Last 24 Hours	Last 7 Days
This Month	This Quarter	This Year
Last Month	Last Quarter	Last Year
Last 30 Days	Last 90 Days	Last 365 Days

Settings


Edit Mode

Settings

Legend

- Level 1 (Green)
- Level 2 (Yellow)
- Level 3 (Red)

Report list and filters

openHistorian EE Sign out 


Reports

Search Name Add Filter

Found 5 Report(s)

Name	Default Range	Default Unit
Report1	120	s
Report2	5	m
Report3	12	h
Report4	1	w
Report5	2	d


Date/Time Filter:

Start of Time Window: 

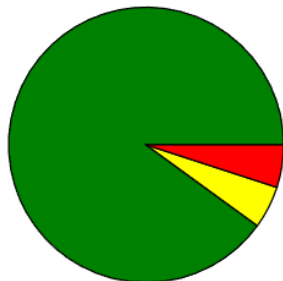
Time Window(+): Day(s) ▾

This Hour Today This Week
Last Hour Yesterday Last Week
Last 60 Minutes Last 24 Hours Last 7 Days

This Month This Quarter This Year
Last Month Last Quarter Last Year
Last 30 Days Last 90 Days Last 365 Days

Settings 

View Mode



- Level 1
- Level 2
- Level 3