



Alarm Analytics™

Product Brief for Alarm Analytics V9.2

April 2010



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Complies with industry standards EEMUA 191 and OSHA PSM 1910.119 for Alarm Analytics, connects to all major databases

ICONICS' Alarm Analytics product enables plant personnel to Visualize, Analyze, and Manage alarm information in accordance with the industry best practices. The push for operational excellence in the manufacturing industry is driving the need for more effective alarm analytics. Proper analysis of alarms and events in a manufacturing plant can reveal significant opportunities for improving current operations and mitigating abnormal situations. BizViz Alarm Analytics captures and analyzes all alarm and event information to identify frequent alarms, chattering alarms, cross-correlated alarms, and many more alarm-related issues. This module also records, analyzes, and displays operator-initiated process changes, which then yield significant insight into the performance of the entire system.



Features	Benefits
Store Alarms and Events to popular databases	Captures and archives alarms, operator actions, and system events into SQL, Oracle, Access or MSDE.
Analyze Alarms in real-time or by a specified time period	Identifies unusual alarm occurrences, trends in plant alarms and control modules responsible for those alarms
Benchmark alarm performance	Benchmarks alarms vs. established standard EEMUA 191 recommended best practices.
Deliver alarm information in industry standard reports	Complies with standards set by OSHA PSM 1910.119.
Leverage Microsoft Excel expertise	Alarm Analytics is built on top of widely used Microsoft® Excel
Real-time Alarm Analytics drives better process understanding	Alarm Analytics provides up-to-the-minute reports that show alarm frequency, statistics, user acknowledgements, alarm priority distributions or system events.
Easy configuration with industry standard predefined reports	Predefined reports and wizards help focus on a plant area, time period or event type.
Identify areas for improvement	Built-in Pareto charts to help rank alarms by frequency and categorize problematic areas such as tag chattering.
Distribute Alarm Analytics reports via e-mail or fax	Users can view reports in Excel, PDF, or HTML format on the Web or receive them via automated e-mail.
Simplifies Incident Investigation	Easily access all recorded events and operator actions.

Alarm Analytics: Industry Standard-based Alarm Reporting

Alarm Analytics, which is based on ICONICS' BizViz ReportWorX and AlarmWorX32 Alarm Logger, provides advanced Alarm Analytics, Alarm Reporting, and Alarm Management. Alarm Analytics supports industry standards for Alarm Management issued by OSHA and EEMUA.

The Alarm Analytics module contains 15 standard reports with advanced Alarm KPIs, including the following:

1. *Alarm Distribution by Interval*
2. *Alarm Distribution by Interval with Priority*
3. *Alarm Distribution by Priority*
4. *Alarm Rate Distribution by Interval*
5. *Alarm Tag Chattering*
6. *Alarm Tag Frequency*
7. *Alarms from Worst Actors by Interval*
8. *Average Alarm Rate per Minor/Major Interval*
9. *Cross-Correlation Analysis*
10. *Operator Changes by Interval*
11. *Operator Response Time*
12. *Peak Alarm Rate Distribution*
13. *Standing Alarms at Time*
14. *Standing Alarms by Interval*
15. *Standing Alarms Duration*



Pre-Configured Templates

Alarm Distribution by Interval

This report provides a quick insight into the frequency of alarms over a specified interval. It shows an alarm transaction count per interval over a time range. The user specifies the time interval such as daily, weekly, or monthly and the report automatically adjusts the chart with the new interval values. In addition, the alarms can be separated out by priority according to priority levels that you can customize to match the standards at your facility.

The color coding corresponds to alarm priority levels, which by default match the EEMUA standards for "critical", "high", "medium" and "low". The Global Alarm Priority Manager allows the user to define the OPC Severity bands that correspond to their custom priorities if different from the EEMUA standards.

Each alarm count bar adds up to 100% of the total count, showing the percent of alarms at each priority. Superimposed on the chart is the total number of transitions into alarm per interval in the form of a line chart. The Alarm Distribution by Interval with Priority chart integrates into Excel's PivotTable functionality for its data.

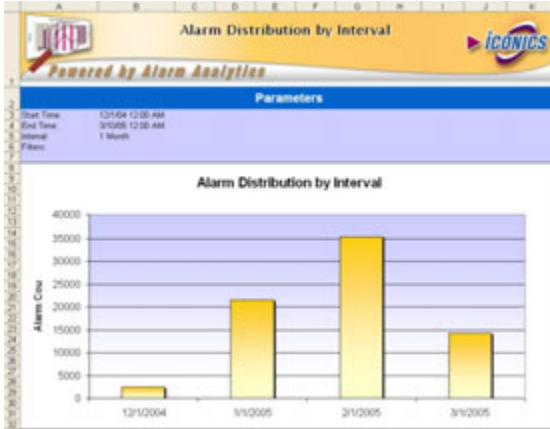


Figure 1: Alarm Distribution by Interval

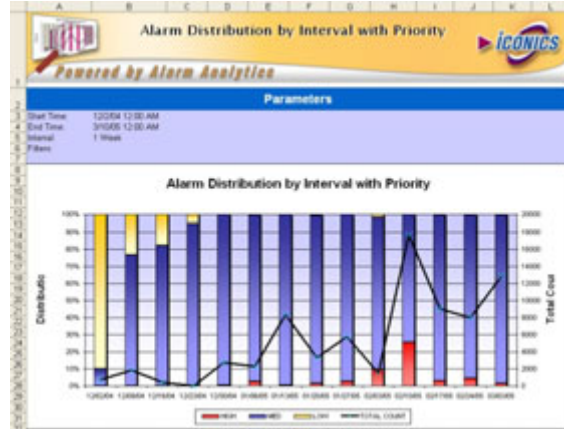


Figure 2: Alarm Distribution by Interval with Priority

Alarm Distribution by Priority

If the distribution of the alarms by priority only is important the best visualization report is Alarm Distribution by Priority. This simple pie chart allows for a quick insight into how many alarms you are experiencing at each priority level. The priority levels are set to EEMUA standards by default (critical, high, medium and low) and can be customized easily with the Global Alarm Priority Manager.

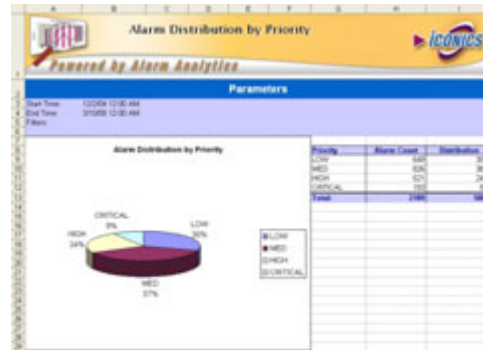


Figure 3: Alarm Distribution by Priority



Figure 4: Alarm Tag Frequency

Alarm Tag Frequency

This report indicates which alarm tags went into alarm most often over a given period of time. The report uses a Pareto chart to sort the alarms by number of occurrences, so the “worst” alarm is the first one in the chart. The user can configure the maximum number of rows to return in the report, effectively turning it into a “Top 10” or “Top X” Pareto chart.

Alarm Tag Chattering

This report is represented by a table that shows alarm tags that go in and out of alarm repeatedly in a short period of time (chattering). The user specifies a time window and the maximum number of rows. If an alarm repeats within the time window it is considered a chattering alarm and part of a cluster. For each tag, the table also includes the number of clusters, the average occurrences per cluster and the total number of occurrences. The table is sorted by the Cluster Member Percentage.

Figure 5: Alarm Tag Chattering

The percentage of occurrences that happen in a cluster (Cluster Member Percentage) is calculated as follows:

$$\text{Cluster Member Percentage} = (\text{Avg. occurrences per cluster}) * (\# \text{ of clusters}) / (\text{total occurrences})$$

Cross Correlation Analysis

This analysis finds alarms that always (or usually) occur one after another which suggests correlation between two alarms. This process compares all combinations of pairs of alarm tags and the results for each alarm pair are shown in tabular format. The table shows the following important information:

Figure 6: Cross Correlation

Occurrence Count – The number of times the child tag occurred after the primary tag, within the time window.

Predictability – The percentage of time that the primary alarm occurred and the child alarm occurred within the time window i.e. 100% if the child

alarm occurred every time the primary alarm occurred.

Significance – The percentage of time the child alarm occurs within the window of the primary, i.e. 100% if the child alarm only occurs after the primary alarm within the time window.

Operator Response Time and Operator Changes by Interval

This report analyzes the time it takes an operator to respond to each alarm condition (Acknowledge, or ACK for short) and the time for the condition to Return to Normal (RTN). Since each row summarizes multiple occurrences, the Min, Max and Average values are shown. The table is sorted in descending order according to whatever the user selects while executing the report. The Operator Changes report by interval shows operator actions as defined in OPC Tracking event in GenEvent audit tracking system.

Tag	Condition Name	Priority	Tag Description	Time To Respond Interval			Time To Return Interval		
				Min	Max	Avg	Min	Max	Avg
ST415	LOW	3	SELECT AM (N) ACTIVO	0	1440	1125	1440	1440	1440
ST415	LOW	3	SENSOR DE LLAMA QUEM 10	0	1440	1125	1440	1440	1440
ST415	LOW	3	FONDO TORRE 3	0	1440	1080	1434	1434	1434
ST415	LOW	3	LPO TORRE TORRE 3	0	1440	1080	1434	1434	1434
ST415	HIGH	3	PRESION TORRE DA2	0	1440	1080	1434	1434	1434
ST415	LOW	3	VAP SOBREC A F1 LINEA A	0	1440	1080	1434	1434	1434
ST415	LOW	3		0	1440	1080	1434	1434	1434
ST415	LOW	3	SODA 10% AL M 320C	0	1440	1080	1434	1434	1434
ST415	LOW	3	SALIDA EAF	0	1440	1080	1434	1434	1434
ST415	LOW	3	TEMPERATURA FONDO TORRE 2	0	1440	1080	1434	1434	1434
ST415	HIGH	3	NIVEL FONDO TORRE DA_2	0	1440	1080	1434	1434	1434
ST415	LOW	3	FONDO TORRE C-2	0	1440	1080	1434	1434	1434
ST415	LOW	3	NIVEL TANQUE BAJO	0	1440	1080	1434	1434	1434
ST415	HIGH	3	TAMBOR CALDERA V-8	0	1440	1080	1434	1434	1434
ST415	LOW	3	ACCETE COMB CALDERA CO	0	1440	1080	1434	1434	1434
ST415	LOW	3	AGUA ENFRIAMIENTO BOMBAS	0	1440	1080	1434	1434	1434
ST415	HIGH	3	ALTA TEMPERATURA ASE	0	1440	1080	1434	1434	1434
ST415	LOW	3	CALC DIFER FLUJO CAL CO	0	1440	1080	1434	1434	1434
ST415	LOW	3	NIVEL DEL FONDO TORRE 4	0	1440	1080	1434	1434	1434
ST415	HIGH	3	FALLA ASE INSTRUMENTO	0	1440	1080	1434	1434	1434

Figure 7: Operator Response Time

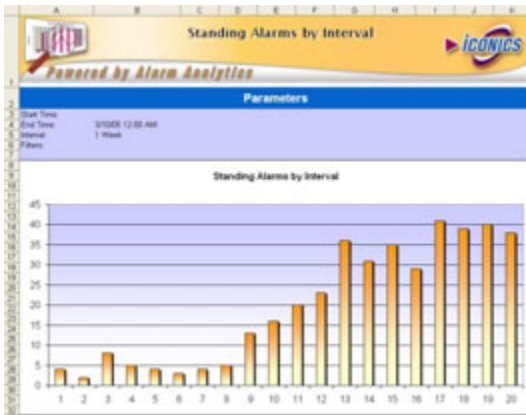


Figure 8: Standing Alarms by Interval

Standing Alarms at Time, by Interval and Duration

Standing alarms are the ones that show up on the AlarmWorX32 viewer (i.e. active and/or unacknowledged alarms). A snapshot of the number of standing alarms is captured at the end of each interval and is displayed on a bar chart. The related reports include Standing Alarms at Time and Standing Alarm Duration.

Configuring Alarm Analytics

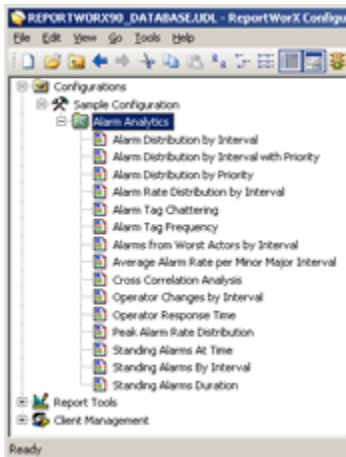


Figure 9: Report Configurator

Alarm Analytics users can now visualize all of their configured data sources in one centralized location and edit them through simple property dialogs. This leads to much better performance when loading and editing your reports.

Another revolutionary new feature is the Layout Manager. By far the most noticeable difference for our users will be the ease with which they can now configure many cells for data. Hundreds of OPC tags can be added to a report in just seconds!

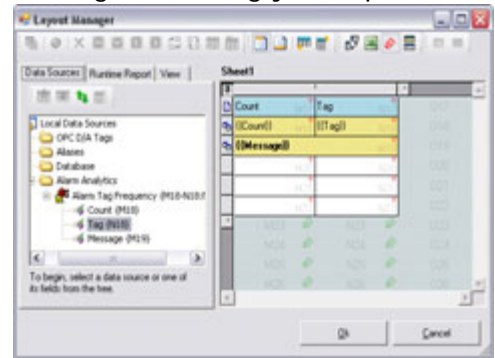


Figure 10: Layout Manager

Unified Web Interface

Alarm Analytics leverages the power of the Unified Web Interface for V9.2, which allows users to visualize, execute, and manage their reports and transactions from any Web-accessible, thin-client browser.

The Unified Web Interface is ideal for thin-client applications where access to the Alarm Analytics Server is restricted.

Benefits of Unified Web Interface:

- Visualize reports with thin-client browser**
- Execute and manage reports from central location**
- Customize look and feel of your Web interface**
- Sort and group reports for easier navigation**
- Create "Favorite" folder**

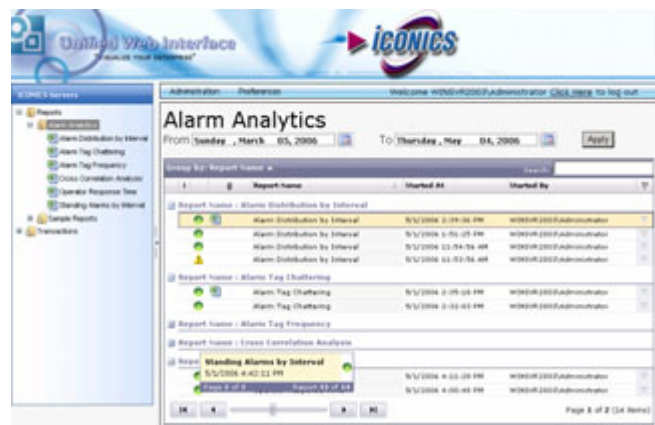


Figure 11: Unified Web Interface

System Requirements

The BizViz Alarm Analytics product includes ReportWorX and AlarmWorX32 Logger and requires the following minimum hardware, software, and operating system components. System requirements may vary based on application size, system performance requirements, and loading factors.

- Microsoft Windows 2000 Professional or 2000 Server, or
Windows XP Professional, or Windows Server 2003
- MSDE 2000, SQL Server 2000, SQL Server Express, or SQL Server 2005
- Microsoft .NET Framework 2.0
- Microsoft Excel 2000 or greater
- Microsoft Internet Explorer 6.0 or greater
- Pentium 4 CPU, 2.0 GHz or greater
- At least 1 GB of available RAM

Alarm Analytics Licensing Options

Alarm Analytics comes in two configurations:

Standard: Includes 15 industry standard Alarm Analytics pre-configured templates, ReportWorX - Standard Edition and AlarmWorX32 - Unlimited.

Enterprise: Includes 15 industry standard Alarm Analytics pre-configured templates, ReportWorX - Enterprise Edition and AlarmWorX32 - Unlimited for the ability to create and run an unlimited number of custom, user defined, Alarm Analytics report.



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WHY CHOOSE ICONICS?

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