Eagle™ TraceServer™

Centralized Data Collection Program

The Eagle TraceServer data collection software records valuable production data and machine status information from one or more Eagle Product Inspection x-ray devices and consolidates it into a single centralized database.

Eagle TraceServer can be installed on a standalone PC or on a network server to provide visibility to the information and operation of the x-ray systems. Data can be accessed from customer provided programs using standard SQL application programming interfaces for integration into other production control and quality programs.

A standard Eagle TraceViewer™ software program is provided with each TraceServer package, this feature allows for information to be viewed, printed and exported.

The Eagle TraceServer provides the user with access to critical production and inspection information. Key functionality includes:

- Valuable information consolidated into a centralized database
- Viewing, printing, and exporting of data and results
- Ability to access data from other programs using standard SQL application interfaces

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Eagle TraceServer™

Centralized Data Collection Program

The Eagle TraceServer™ consists of the following components and services:

|	
TraceServer	A server program that resides on a PC or network server. Connects multiple Eagle x-ray machines to record, store and display production data, implemented as a Windows service.
TraceServer Admin	A software application used to configure TraceServer and monitor the status of the connected machines.
TraceViewer	A software application that allows basic queries on the TraceServer database to view, print, or export queried data.
Postgre SQL	The database management system supplied as standard with TraceServer to store the production data. The program can also be used with customer provided Microsoft SQL Server.
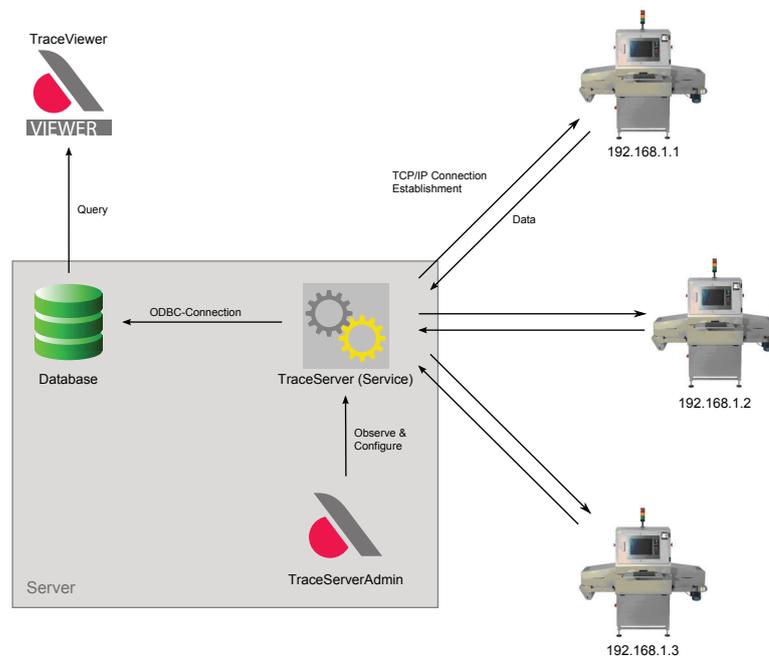
Figure 1: TraceServer Topology

TraceServer Admin

TraceServer Admin allows configuration of the TraceServer and provides continual status monitoring of each Eagle x-ray machine connected. Figure 2 on the following page illustrates an example of a TraceServer Admin user interface monitoring nine individual machines simultaneously.

Each machine's status (1) is shown on the left side of the screen. As inspection operations change, the user has the ability to add or delete machines (2). The machine status displays when there is a good connection between the machine and TraceServer, as well as during other important machine operations including "X-ray On", "Belt Running", "Machine Warning/Fault", "Machine Normalizing" and "Machine Processing".

In the center of the screen is the Log which displays information of the various events which have occurred. The events are classified (3) into four categories:

- **(I) Info:** general information which has occurred (e.g. new table created)
- **(E) Error:** an error has occurred during operation (e.g. consecutive reject limit exceeded)
- **(M) Machine Event:** a machine sent an event based message (e.g. batch complete)
- **(O) ODBC:** messages from the database

Machine information may be viewed (4) individually or simultaneously with other connected machines where further segmenting of the data into tabs by Info, Error, Machine Event, and ODBC (5) comes standard as another convenient feature for the user. The user interface can display up to 256 log entries (6) based on a FIFO (first-in-first-out) format. All log entries are retained in the database and can be retrieved, viewed, and exported from the program simply by choosing the "Reveal Log Files" from the "File" menu.
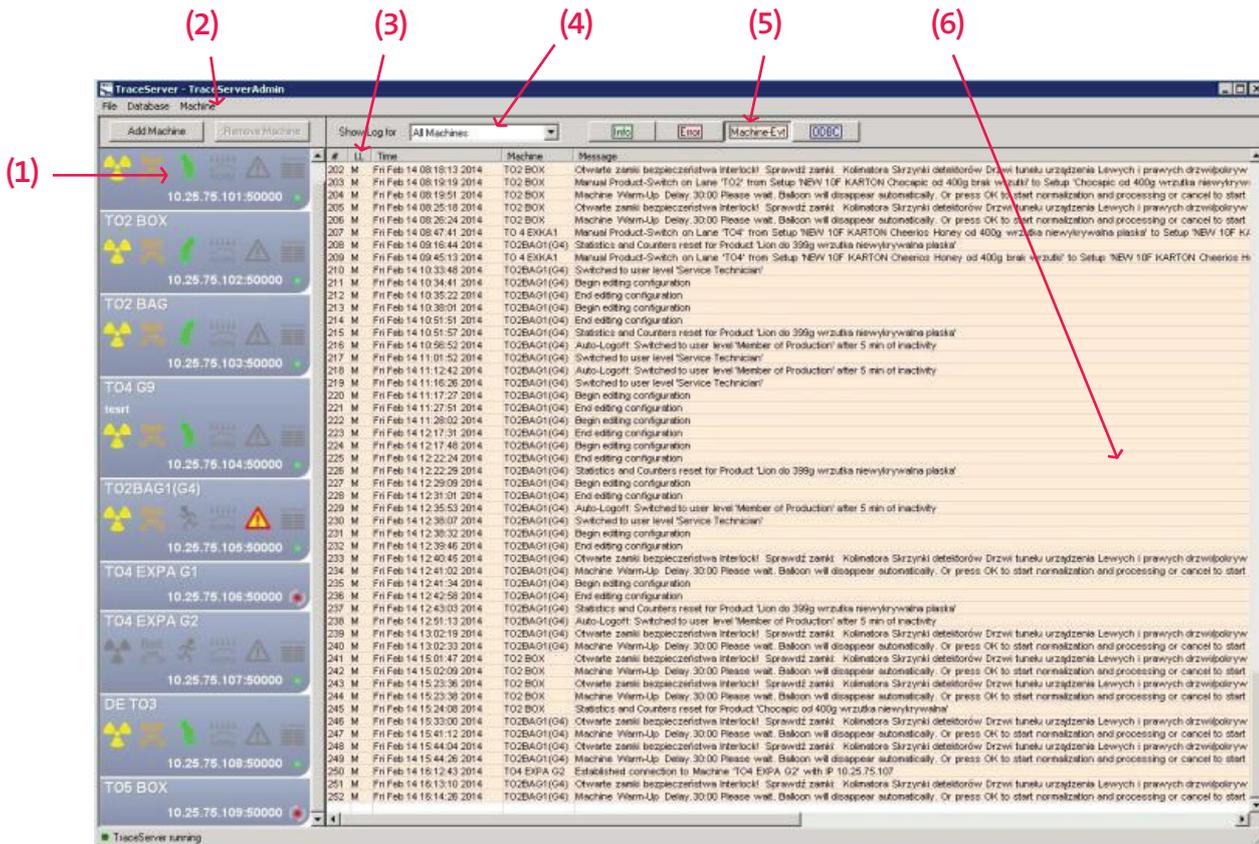
Figure 2: TraceServer Admin User Interface Example

TraceViewer User Interface

TraceViewer is a standard software application which enables users to query the TraceServer database to view, report and export data. The program can be installed either on the server where TraceServer is located or on a separate client PC. Multiple TraceViewer programs can be installed for accessing the data in a single TraceServer database thereby unlocking the available information to more users. The TraceViewer user interface (Figure 3) provides the user with a wealth of information in an easy to use format. Filters (7) are available to deliver a focused view of data and results. The filter selections include: Machine, Lane, Product, Batch, Time Span, and Bar Code Number. Navigation tabs (8) allow the user to switch views in order to quickly view system configuration and performance. Descriptions for each view are in the next section. Displayed information can be viewed (9) by "Rejects Only", "Accepts Only", or "All Objects". Further all rejected items are color coded in red shaded rows (10), with the type of reject listed (e.g. Contaminant, Weight, etc.) for easy identification.

TraceViewer Main Navigation Tabs

Machines: Information including Name, IP Address, and Serial Number. A sub-tab also enables the user to view the Events Log by individual machine or for all machines connected.

Lanes: Eagle x-ray machines can be set-up for single or multi-lane operation. This tab shows what products are associated with specific machine lanes.

Products: Provides information on each product which is associated with the query including throughput, accept, and reject counts.

Batches: Product and Batch ID are displayed and include start and end times along with their completion date and total number of products accepted.

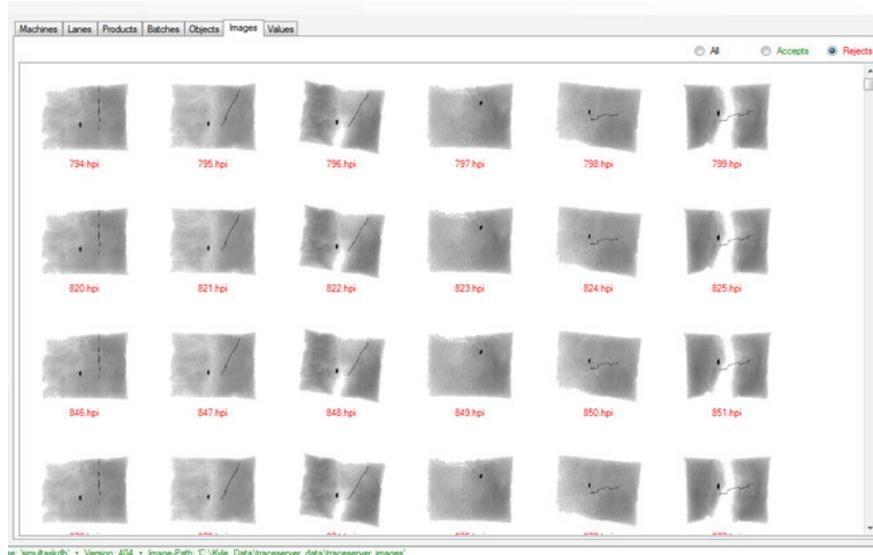Figure 3: TraceViewer User Interface

Figure 4: TraceViewer Images Tab

Objects: By enabling the "Save Images" function, this view provides information on each object which has passed through the x-ray including the image file name of the object.

Images: Each image saved to the database is accessible through this tab (Figure 4). The images are further filtered to show all Accepts, all Rejects, or all Stored images. This feature also allows the user to view expanded image of each file for further analysis.

Values: There are numerous values which can be captured using an Eagle x-ray system. The Values Tab allows you to view the results based on the value type you want to see in detail (e.g. Weight/Mass). The four sub-tabs: List (Figure 5), Values (Figure 6), Timeline (Figure 7) and Histogram (Figure 8) deliver the production data and summary information based on the value type selected which Operations, Quality, and even Maintenance personnel will find very beneficial.

Figure 5: Values Tab - List

List: Listing of each item scanned with their individual Product ID, Time & Date, Bar Code (if used), Reject Type, Image File, and Value selected listed.

Figure 7: Values Tab - Timeline Chart

Timeline: The Timeline chart shows process performance over time, scalable for both short and long term trends.

Figure 6: Values Tab - Overview

Overview: Summary counters and statistics are provided for the number of accepts, rejects and standard deviation. It also calculates giveaway, range, plus counts and totals by zones.

Figure 8: Values Tab - Histogram Chart

Histogram: The Histogram chart delivers concise visualization of the process results.

TraceViewer Main Data Output

TraceViewer can deliver a standardized report (Figure 9) in a .pdf format for viewing, printing, and archiving. Summary information includes counter totals (11), weight statistics (12), statistics by zone (13) and snapshots (14) of the Timeline and Histogram Charts. Additionally individual item data can be exported from TraceViewer in .csv file format (Figure 10).
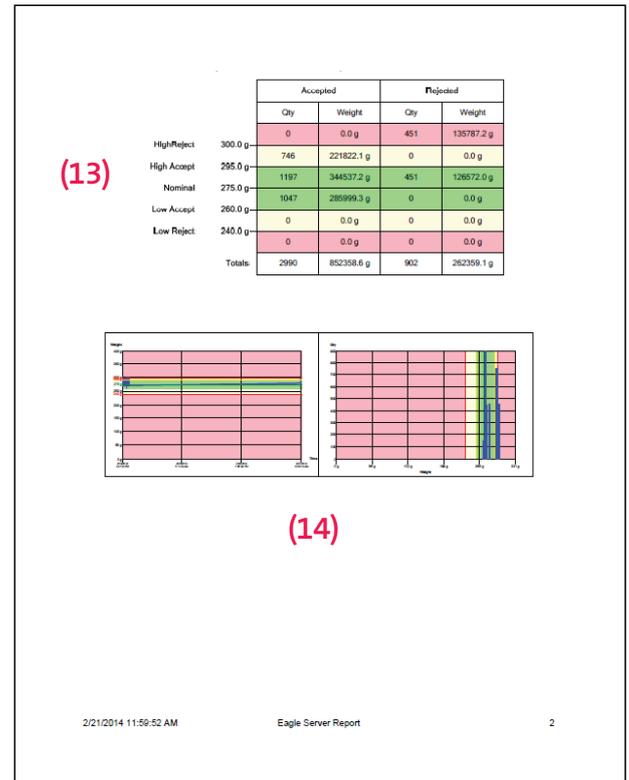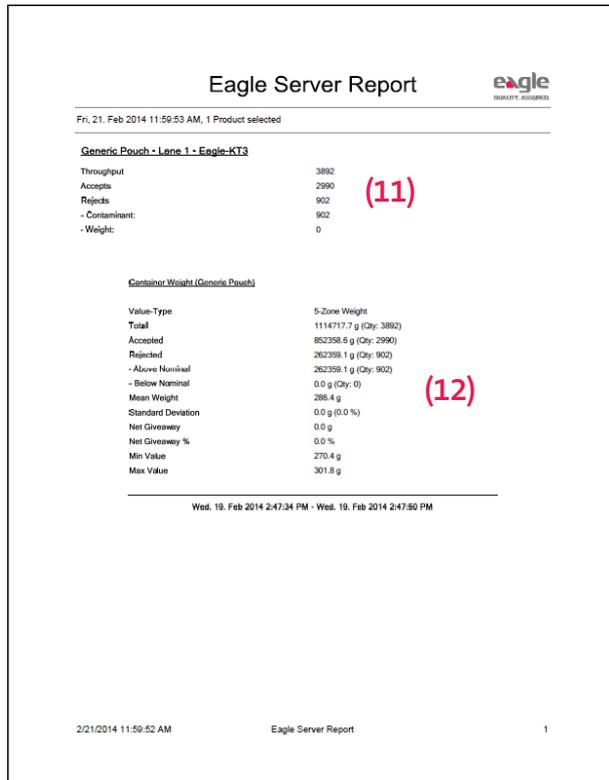

Figure 9: Eagle TraceViewer Summary Report

	A	B	C	D	E	F	G	H
1	Object-ID	Product	Time	Throughput	Barcode	Rejecter	Image	Container Weight [g]
2	790	Generic Pouch	2014-02-19T15:15:16	1				294.9159249
3	791	Generic Pouch	2014-02-19T15:15:18	2				293.601741
4	792	Generic Pouch	2014-02-19T15:15:19	3				298.4813402
5	793	Generic Pouch	2014-02-19T15:15:21	4				295.5166469
6	794	Generic Pouch	2014-02-19T15:15:24	5		Contaminant	images_2014_02_19\794.hpi	280.3773822
7	795	Generic Pouch	2014-02-19T15:15:25	6		Contaminant	images_2014_02_19\795.hpi	280.5947674
8	796	Generic Pouch	2014-02-19T15:15:27	7		Contaminant	images_2014_02_19\796.hpi	280.9663533
9	797	Generic Pouch	2014-02-19T15:15:28	8		Contaminant	images_2014_02_19\797.hpi	300.2495093
10	798	Generic Pouch	2014-02-19T15:15:30	9		Contaminant	images_2014_02_19\798.hpi	301.2476755
11	799	Generic Pouch	2014-02-19T15:15:31	10		Contaminant	images_2014_02_19\799.hpi	301.7522493
12	800	Generic Pouch	2014-02-19T15:15:33	11				273.0004968
13	801	Generic Pouch	2014-02-19T15:15:34	12				270.4213681
14	802	Generic Pouch	2014-02-19T15:15:36	13				273.1717507
15	803	Generic Pouch	2014-02-19T15:15:37	14				277.6296849
16	804	Generic Pouch	2014-02-19T15:15:39	1				274.1811898
17	805	Generic Pouch	2014-02-19T15:15:40	2				273.0608618
18	806	Generic Pouch	2014-02-19T15:15:42	3				276.7833232
19	807	Generic Pouch	2014-02-19T15:15:43	4				274.2732136
20	808	Generic Pouch	2014-02-19T15:15:45	5				278.3400158
21	809	Generic Pouch	2014-02-19T15:15:46	6				273.9967632
22	810	Generic Pouch	2014-02-19T15:15:48	7				297.5063655
23	811	Generic Pouch	2014-02-19T15:15:49	8				298.4286541
24	812	Generic Pouch	2014-02-19T15:15:51	9				294.3278791
25	813	Generic Pouch	2014-02-19T15:15:52	10				293.3338156
26	814	Generic Pouch	2014-02-19T15:15:54	11				293.7568617
27	815	Generic Pouch	2014-02-19T15:15:55	12				294.9159249
28	816	Generic Pouch	2014-02-19T15:15:57	13				293.601741
29	817	Generic Pouch	2014-02-19T15:15:58	14				298.4813402

Figure 10: TraceViewer Data Export in .csv Format

Recordable Data

Model	Eagle TraceServer™ V4.0.6
Machine Data	Time & Date, Machine Logs & Events, Reject On Input (external signal from another sensor/device to initiate the x-ray reject)
Lanes & Products	Data by lane (if multi-lane operation) and by product from all connected / selected machines.
Batches	Batch ID, Product Name, Start/End Time, Batch Number, Identifier, Charge Number, Number of Inspected Packages/Objects, Measurement Criteria (e.g. weight, count, etc.)
Sub-Batches / Partitions	ID, Start/End Time, Value, Sum & Count
Package / Object Data	Batch & Product/Object ID, Throughput Number, Bar Code (if used), Rejecter (if rejected), Stored Images, & Sub-Batch Partition.
Reject Reasons	User definable Reject Reasons (e.g. missing premium/prize or insufficient item count) configured in SimulTask 4 for transmission and recording in TraceServer.
Images	No Images Captured, Reject Only, Good Only, or All Images selections configured within SimulTask 4 for transmission and recording in TraceServer.
Values	Values are either listed or graphically represented in a histogram, timeline, or tabular overview format for data values including Zone Totals, Average Weight, Standard Deviation, Net Giveaway, Weight, & Count. Additional values for Fat Analysis systems include Chemical Lean (CL), CL-Weight, Protein, & Moisture.

Remote Monitoring

Monitoring Program	TraceServer Admin program running on TraceServer machine
Machine Status	X-ray On/Off, Belt On/Off, System Processing, System Normalizing, & Error Conditions
System Logs	System Information, Machine Events, Database Messages, Operational Errors

System Specifications

Machine Compatibility	Eagle x-ray machines with SimulTask™ 4 Image Processing and Control Software Version 4.23.0 or greater
Machine Connections [1]	Up to 32 Eagle x-ray machines can be attached to a single TraceServer installation
Database [2]	Postgre SQL 9.2 or higher supplied with TraceServer also compatible with Microsoft SQL Server versions 2008 (R2) through 2019.
Server Requirements [3, 4]	Compatible with Windows Server OS from versions 2008 (R2) through 2019, Intel Dual Core ≥2GHz or higher with ≥4GB of RAM; ≥500GB hard drive free space, 1024 X 768 Display resolution; CD-ROM drive and 100 Mbps Ethernet minimum required, latest Microsoft Server OS with GigE (1 Gigabit Ethernet) & 16GB RAM recommended. A virtual server machine environment can be used.
Client Program	Eagle TraceViewer V1.3 is a standard pre-configured client software program supplied with TraceServer for viewing, exporting, and printing of information contained within TraceServer. TraceViewer exports can be .pdf, printed or stored as .csv files for further processing by external programs.
TraceViewer Client Requirements [4]	Windows 8.1 or Windows 10 Professional or Enterprise Versions, Intel Dual Core ≥2GHz or higher with ≥2GB of RAM; ≥20GB hard drive free space; DirectX 9 or greater graphics card with WDDM1.0 driver, 1024 X 768 Display resolution; CD-ROM drive, 100 Mbps Ethernet required/ 1GigE recommended, Adobe Reader V9.0 or greater & Microsoft Excel 2003 or greater
Scope of Supply [2,3,4,5]	Application software for PC/Network, Ethernet TCP/IP connection interface for Eagle x-ray machine

[1] May be limited to less than shown based on customer supplied computer, servers, network traffic, configuration, capacity and topology
[2] Microsoft SQL Server is not supplied with TraceServer by Eagle PI; it must be purchased, installed and configured separately by customer
[3] Minimum system requirements to support 3 to 5 machines connected; larger installation will require additional server performance and storage capacity
[4] Server and client computers, network connections, routers, hubs and cabling are not included; they are supplied & prepared by the customer
[5] Integration to 3rd party programs are not included; they must be created, supplied and supported by customer

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