

2025 EU Users Group

FDC Process Control & Applications

Jon Holt - PDF

Sr Director, Product Management

This presentation and discussions resulting from it may include future product features or fixes, or the expected timing of future releases. This information is intended only to highlight areas of possible future development and current prioritizations. Nothing in this presentation or the discussions stemming from it are a commitment to any future release, new product features or fixes, or the timing of any releases. Actual future releases may or may not include these product features or fixes, and changes to any roadmap or timeline are at the sole discretion of PDF Solutions, Inc. and may be made without any requirement for updating. For information on current prioritizations and intended future features or fixes, contact sales@pdf.com.

PDF Solutions, Exensio, CV, Cimetrix, the PDF Solutions logo, and the Cimetrix logo are registered trademarks of PDF Solutions, Inc. or its subsidiaries. All other trademarks cited in this document are the property of their respective owners. Exensio visualizations Powered by TIBCO®.

© 2025 PDF Solutions, Inc. or its subsidiaries. All rights reserved.

AGENDA

INTRODUCTION

Jonathan Holt
Sr. Director, Product Management

WELCOME

Didier Vieux
Sr. Technical Product Manager

FDC SOLUTIONS

Maestria Updates
Mathieu Franco
Process Control Product Manager

Maestria BSM Presentation
Mathieu Franco,
Process Control Product Manager

Exensio Process Control Updates
Jianlei Tao
Manager Field Applications

FDC NEW GENERATION STATUS

New Capabilities, Add-Ons
Jonathan Holt
Sr. Director, Product Management

GUEST SPEAKER

Generative AI Virtual Assistants for Semiconductors
Ankush Oberoi, Ph.D.,
President and CEO Lavorro,

CCG

**Cimetrix Connectivity, Control, and Smart
Factory Product Road Map Highlights**
Alan Weber, VP New Product Innovation (CCG)

SECUREWISE

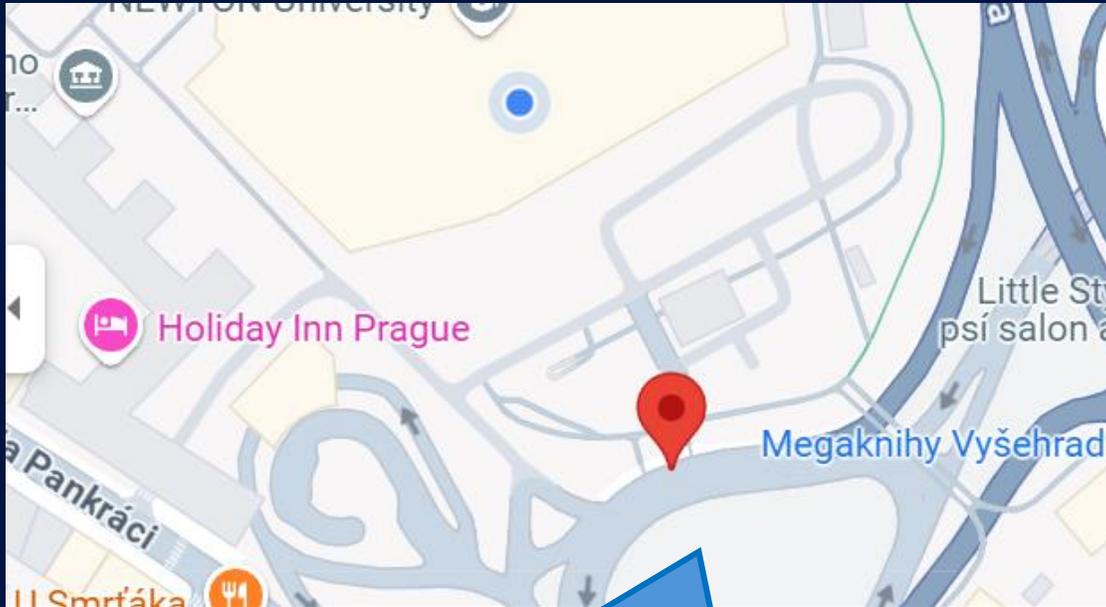
**Secure Remote Connectivity Solutions for
Semiconductor Manufacturers**
Grant Swanson, Director of Sales and Business Development



Detailed Agenda

Session	Topic	Presenter	Start	Stop	Duration	
Welcome	Introduction	Jonathan Holt	14:00	-	14:05	05:00 mn
	Organization of the Meeting	Didier Vieux	14:05	-	14:10	05:00 mn
FDC Solutions	Maestria Updates	Mathieu Franco	14:10	-	14:40	30:00 mn
	Maestria BSM Presentation	Mathieu Franco	14:40	-	15:05	25:00 mn
	Exensio Process Control Updates	Jianlei Tao	15:05	-	15:30	25:00 mn
FDC New Generation	New Capabilities, Add-Ons	Jonathan Holt	15:30	-	16:00	30:00 mn
	COFFEE BREAK		16:00	-	16:30	30:00 mn
Guest Speaker	Generative AI Virtual Assistants for semiconductors	Ankush Oberoi	16:30	-	16:50	20:00 mn
CCG	Cimetrix Connectivity - Product Roadmap highlights	Alan Weber	16:50	-	17:10	20:00 mn
SECUREWISE	Secure Remote Connectivity Solutions	Grant Swanson	17:10	-	17:30	20:00 mn
Evening Event:	Cruise on the Vltava river		18:15	-	22:00	

Evening Event: Cruise on the Vltava River



Bus Transportation at 6.15pm



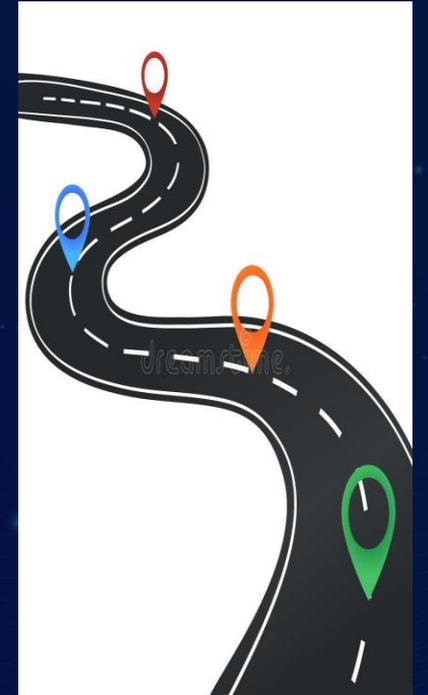
Our Boat



If you miss the bus, go to E. Benese street 118 00 Prague 7 – Subway C then A

PDF Vision & Roadmap for Process Control

- Roadmap to enable upgrading Maestria and Exensio Process Control to deploy new AI and advanced solutions for Maestria and E-PC customers
- Maestria data collection fully backwards compatible, bulk indicators generated in Maestria and automated filters/SPC strategies utilized in advanced solutions and AI applications
- Provide Maestria customers access to new features, applications, existing Process Control features, and new AI capability
 - Auto-window / auto-indicator model creation
 - Auto-retarget adjustment of limits for PM, shift and drift
 - Interactive dashboards and templates
 - Knowledge augmented solutions (LLM's)
- Provide new AI/ML automated capability to significantly improve engineering efficiency and reduce effort and API's to enable 3rd party applications



Outlook for AI and E-PC **Unification** with Maestria

■ **GOAL: Key capability to support AI and advanced control solutions**

1. An “**edge**” to “**cloud**” enterprise solution to link process data across the supply chain.
2. Hi-performance and scalable architecture to manage the **data volumes** and **collection speeds** required in new factories (from EDA Freeze-III to streaming) at a lower cost
3. Utilization of Exensio platform **automation and machine learning** to rapidly deploy control plans and MV predictive models **at the edge**
4. Enabling all SEMI standard data collection, native fab models and FDC for **other domains** like Assembly, Battery, SiC, etc...
5. Fab **Dashboards and Guided Analytics** to monitor the entire factory floor and enable drilldown to OOC events quickly
6. New capabilities: a) **Sapience Manufacturing HUB**; b) **R2R APC control**; c) **ModelOps** for FDC; d) **Realtime** streaming process control; e) **WTC** Whole Trace Control; f) **Knowledge Augmented Solutions (LLM)**



FDC Strategic Roadmap

Products/Features Released last 12-mo

Advanced SPC Module, Sapience integration
Whole Trace Control, Real-time FDC, ModelOps for FDC

N-2

- Spotfie 12
- Windows 11 for client
- Global preference enhancement

N-1

- Artifact Status management
- Custom Script UX
- Virtual Sensor UX
- 3rd Party R2R support
- 3-Tier Security

Included in next LTS

NOW

- RHEL8 for Exensio services
- Filter Plan Manager enhancement
- OPC UA
- Linux PassThrough

N+1

- Advanced SPC module
- Web UI for model configuration
- EDA DC enhancement
- Public API for artifacts
- RHEL9 support
- Apache Pulsar / Kafka Support

N+2

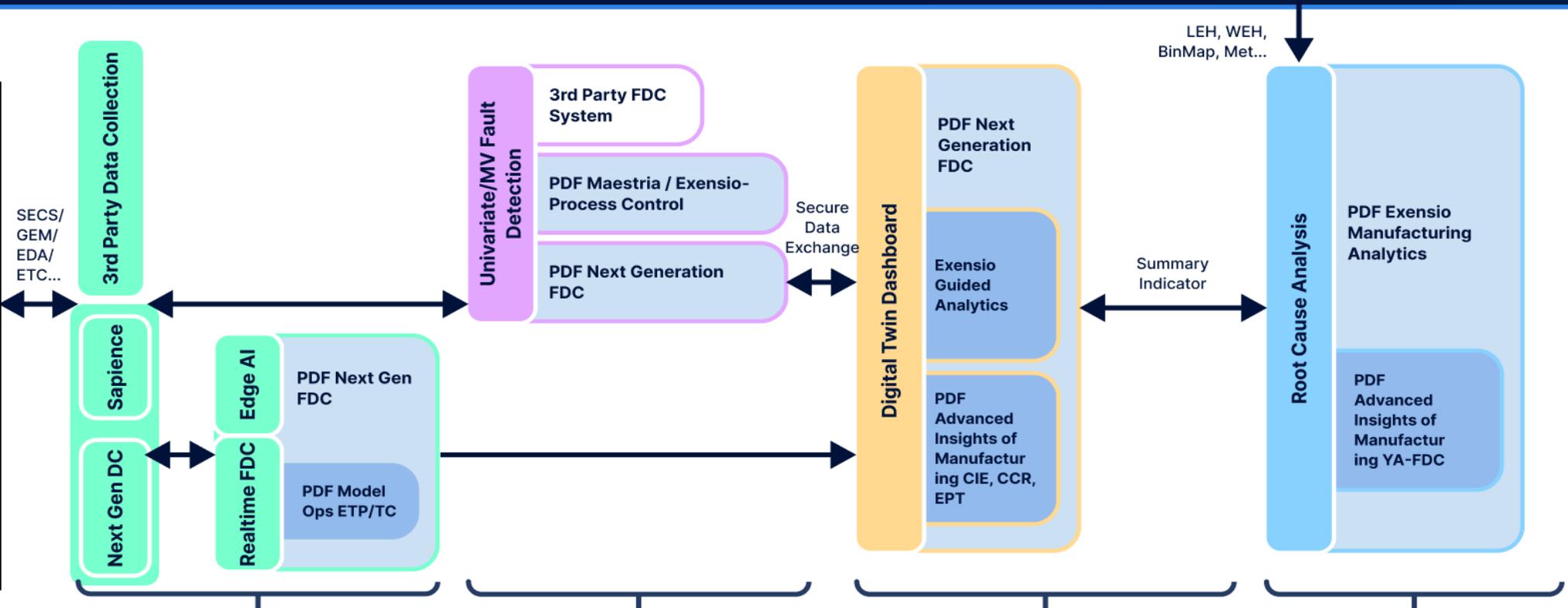
- Whole Trace Control
- ModelOps for FDC
- Real-time FDC
- Knowledge Augmented solutions



Unified FDC Process Control



MES



- 3rd Party Systems
- Next Gen FDC
- Next Gen Modules

Level 0

Data collection and In process fault detection

- Adaptability for various protocol/format
- Performance: low latency

Level 1

Post process fault detection

- Revision controlled FabModel
- Auto limit, auto retarget for limit maintenance
- Performance: high though put

Level 2

Digital Twin dashboard

- AI/ML leveraged automated modeling
- Normalization and Aggregation to explore and drilldown to sensor trace
- Performance: UI response

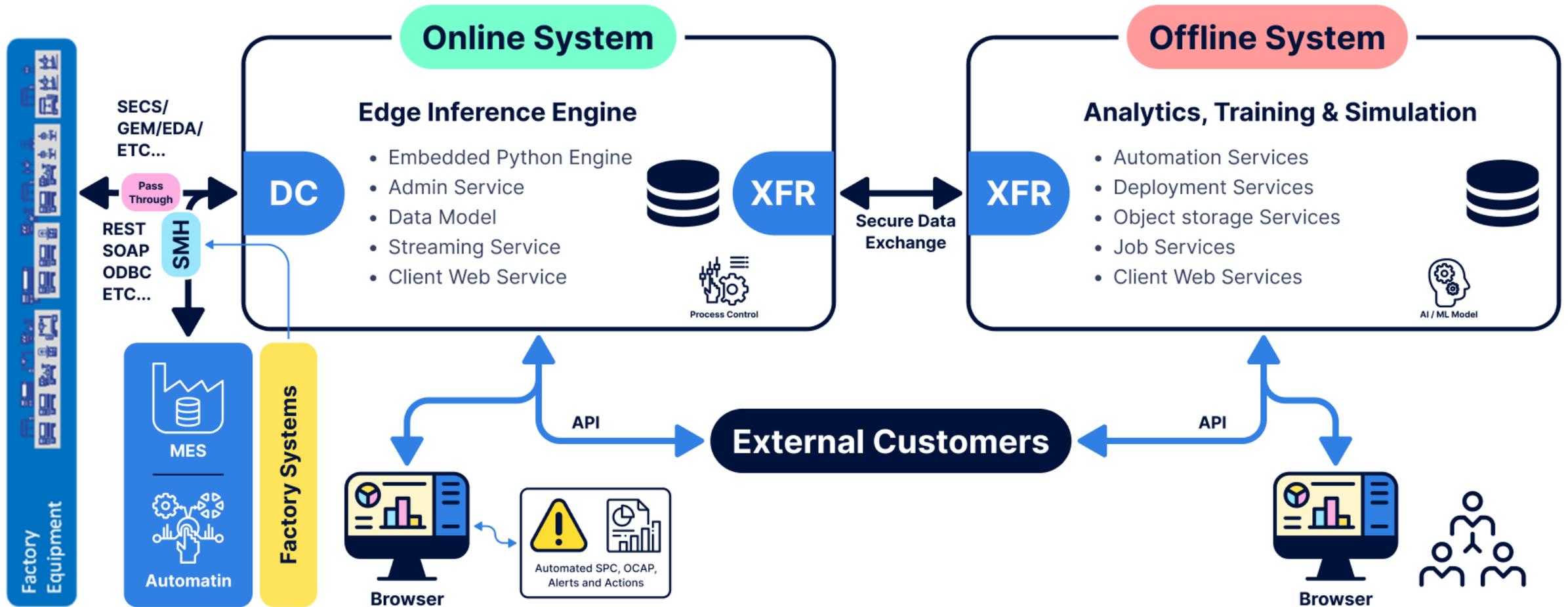
Level 3

Root cause analysis

- Well aligned sematic aware data model
- ad hoc analysis and auto reporting
- various multivariate analysis capability

Separation of On-prem Edge (Online) & Training (Offline) Systems

Simplified architecture diagram



Bulk Management on Maestria or E-PC Indicators WECO/SPC Limits

Changes in Maestria Strategies will flag synchronization issues with existing WECO to be user reviewed and updated

Bulk selection of indicators across to apply WECO rules across strategies

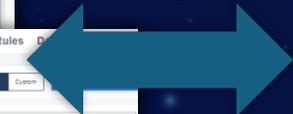


The screenshot displays the 'exensio' WECO Rules interface. The top section, 'Attaching WECO rules to indicators', shows a list of indicators and available WECO rules. The 'Available WECO Rules' table includes columns for Name, Type, Limit Band, Excursion Type, Failed Length, Run Length, Duration, DCQW Enabled, Alert On, Disabled, and Description. Below this, the 'Historical View' for indicator 'SIB0_ABSStep(SIBDev)Flow_He_Backside_Edge' is shown, including a table of context items and a 'History of Limits and WECO setup' graph.

Indicator T1	Strategy T1	WECO Rules T1	Equipment T1	Module T1	Recipe T1
Area(Flow_FCS_A)	RA_AllRecipes_PM6	0/0	ETELX07	PM6	HP-SEAS-LIGHT
Area(Flow_FCS_C4F6)	RA_AllRecipes_PM6	0/0	ETELX07	PM6	HP-SEAS-LIGHT
Area(Flow_FCS_C4F6_ARDQ)	RA_AllRecipes_PM6	0/0	ETELX07	PM6	HP-SEAS-LIGHT
Area(Flow_FCS_C4F6)	RA_AllRecipes_PM6	0/0	ETELX07	PM6	HP-SEAS-LIGHT
Area(Flow_FCS_C4F6_ARDQ)	RA_AllRecipes_PM6	0/0	ETELX07	PM6	HP-SEAS-LIGHT
Area(Flow_FCS_C4F6)	RA_AllRecipes_PM6	0/0	ETELX07	PM6	HP-SEAS-LIGHT

Name T1	Type T1	Limit Band T1	Excursion Type T1	Failed Length	Run Length	Duration T1	DCQW Enabled	Alert On	Disabled	Description T1
19_OF_35_INCREASING_DRIFT	Drift	Any	Increasing	20		Points	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	19 out of 35 Increasing Drift
2_OF_12_INCREASING_DRIFT	Drift	Any	Increasing	2		Points	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	69 out of 12 Increasing Drift
63_OF_91_INSIDE_CTL	Limit-Basic	Control	Outside Both	8	88	Points	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	63 out of 91 Inside Both Control Limits

Context ID T1	Strategy T1	Equipment T1	Module T1	Recipe T1	Start Time T1	Material T1	Lot T1	Wafer T1
582746d5466-4291-8c9c-9e1a56748f6	LT_BCTT00-1-G140_PM6	ETELX07	PM6	BCTT00-1-G140-01	2024-01-19T19:24:49.07Z	Q348972.01		
0ac1c3c9-44ac-4109-a690-8d562acada91c	LT_BCTT00-1-G140_PM6	ETELX07	PM6	BCTT00-1-G140-01	2024-01-19T19:35:03.63Z	Q348972.03		
5c6ea0f5b09a-4077-031a-f5c19c13b506	LT_BCTT00-1-G140_PM6	ETELX07	PM6	BCTT00-1-G140-01	2024-01-19T19:45:21.22Z	Q348972.05		
1a731292-bd9e-4d6c-8d6d-c4fa58413030	LT_BCTT00-1-G140_PM6	ETELX07	PM6	BCTT00-1-G140-01	2024-01-19T19:50:26.74Z	Q348972.06		
9846c9ae-d09e-4220-915d-3451709154b	LT_BCTT00-1-G140_PM6	ETELX07	PM6	BCTT00-1-G140-01	2024-01-19T21:49:02.54Z	Q348972.02		



Maestria Strategy Indicators / SPC Limits from MariaDB

List of Maestria strategies available extracted from MariaDB

Exensio Process Control configurations versioned. WECO results and alarms stored in Cassandra

Enabling Guided Analytics & Dashboards In FDC



Our Goals:

- Customization for User-Centricity
- Proactive Insights for Predictive Action
- Seamless Integration for Data Consistency

User Experience Enhancements:



- Context-Aware Navigation
- Real-Time Notifications
- Guided Actions
- One-Click Solutions
- Visual Storytelling



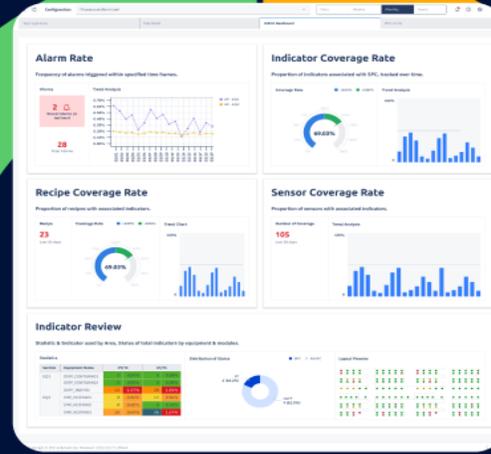
Capabilities:

- Customizable Metrics
- Proactive vs. Reactive
- Advanced Analytics

Usability Features:



- Intuitive Dashboard Layout
- Cross-Platform Compatibility
- User-Centric Design
- Easy Collaboration
- Quick Access to In-depth Analysis



Enabling Guided Analytics & Dashboards in FDC

Summary of Progress

- PDF has made progress enabling our customers to use both Maestria and Exensio Process Control to securely deploy new features, AI, and advanced solutions
 - Bulk Strategy Manager & Versioning
 - Linux Pass Through
 - WECO / SPC module for both Maestria & E PC with machine learning and automation (shift / drift, bulk deployment, etc)
 - API enhancement to support 3rd party applications
 - 3-Tier Security Enhancement
 - Dashboards & more...
- Roadmap to enable new capabilities that can be utilized by both Maestria and Exensio Process Control customers as well as 3rd party applications

Thank You

PDF / SOLUTIONS™

 TWITTER
@pdf_solutions

|  FACEBOOK
pdfsolutionsinc

|  LINKEDIN
@pdf-solutions