



Valmet DNAe Innovative User Experience (UX) in DCS

One System for Plant Operations, Analytics and Advanced Process Controls

Ramesh Chandra Chirravuri, Valmet

Industry challenges related to DCS

Apart from all below, the total cost involvement is a challenge



Reliability

The primary function of DCS is to secure continuous trouble-free production

Data as an asset

Managing and analyzing data effectively is essential for optimizing processes and making informed decisions

Interoperability

DCS needs to be integrated with other automation systems and ERP/MES systems.

Cybersecurity

DCSs are increasingly becoming targets of cyberattacks. IT/OT convergence brings

Labor and skill shortage

More complex tasks must be handled with fewer people at the mill

Adaptation to change

Pulp & Paper industry is continually evolving, and DCS needs to adapt to new production requirements

Valmet DNAe – the future-proof Distributed Control System

What's new?

- Fully web-based with industry leading usability and cybersecurity
- Helps improve efficiency, productivity, sustainability and safety of operations
- Provides a solid platform for more digitalized, autonomous operations
- Market leading lifecycle approach with gradual upgrade paths from Valmet DNA



Valmet's framework for autonomous operations

What is your target level of autonomy?

Manufacturing system optimization

Optimize outcome of the mill

Production optimization

Optimize mill-wide or cross-value chain

Process optimization

Optimize individual process areas

Connected, intelligent process technology

Maximize asset performance

BUILDING BLOCKS

AUTONOMY LEVEL OF OPERATIONS

1. Partially automated

Most subtasks in control. Humans specify set points and are in charge of safe operations. A lot of field inspections and manual interventions.

2. Fully automated

Basic process controls in use for all processes. Machine vision applied to reduce field inspections. Humans react on abnormal situations and are in charge of safe operations.

3. Semi-autonomous

Occasional autonomy through advanced process controls for particular performance or economic improvement. Robots handle hazardous field tasks. Humans supervise and define the intent.

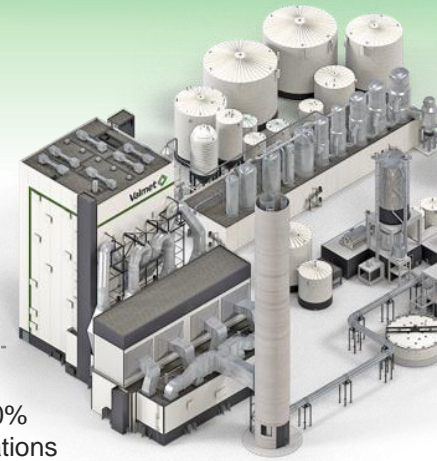
4. Orchestrated

The system alerts and advices on the best performance or economic operation point on mill level. The system adapts to deviations dynamically. Humans confirm the actions.

5. Autonomous

Production at 100% control in all situations without manual intervention. The system is able to react on deviations or disturbances automatically. Humans may supervise the operations.

Empowering people to perform at their best



Future-proof, All in one autonomy enabling solutions

One system for all plant digitalization needs

CONTROL AND OPTIMIZATION

Mill-wide and cross-value chain optimization

Sub-process optimization (APC)

Data driven advisory applications

Process automation

Analyzers, measurements, profilers



SMALL, MEDIUM & LARGE CENTRALIZED CONTROL ROOMS



FIELD OPERATION & MAINTENANCE



OFFICE & MANAGEMENT



VALMET & CUSTOMER REMOTE USERS

ASSET PERFORMANCE MANAGEMENT

Machine condition monitoring

Process equipment monitoring

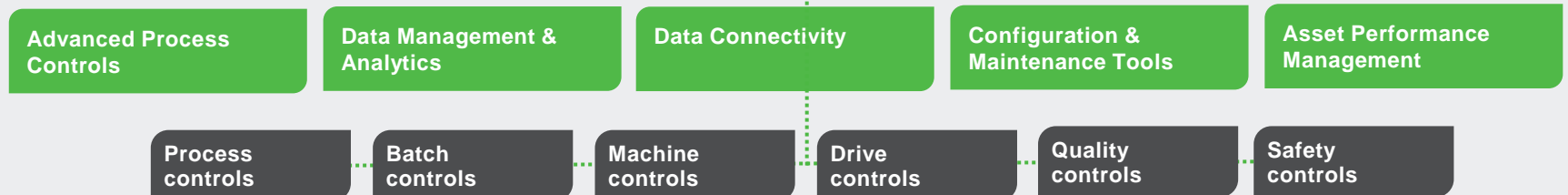
Field device management

Automation system management

One system for all plant digitalization needs

System architecture built to deliver maximised Utilization, reliability and performance

- From simple logic controls to most advanced control applications in the same system
- Simplified architecture resulting in high availability
- Web based system and tools enabling vast data driven opportunities
- Built in Dashboards, advance monitoring and controlling applications deployment



Certified cybersecurity

Inherently cybersecure by design with layered defense-in-depth

Secure product development methodologies based on IEC 62443-4-1

System security requirements and security levels based on IEC 62443-3-3

Centralized user management (AD), role-based access control, authentication and encryption

Certified reference network architecture with segmentation and DMZ security zones

Intrusion detection / prevention and centralized log management

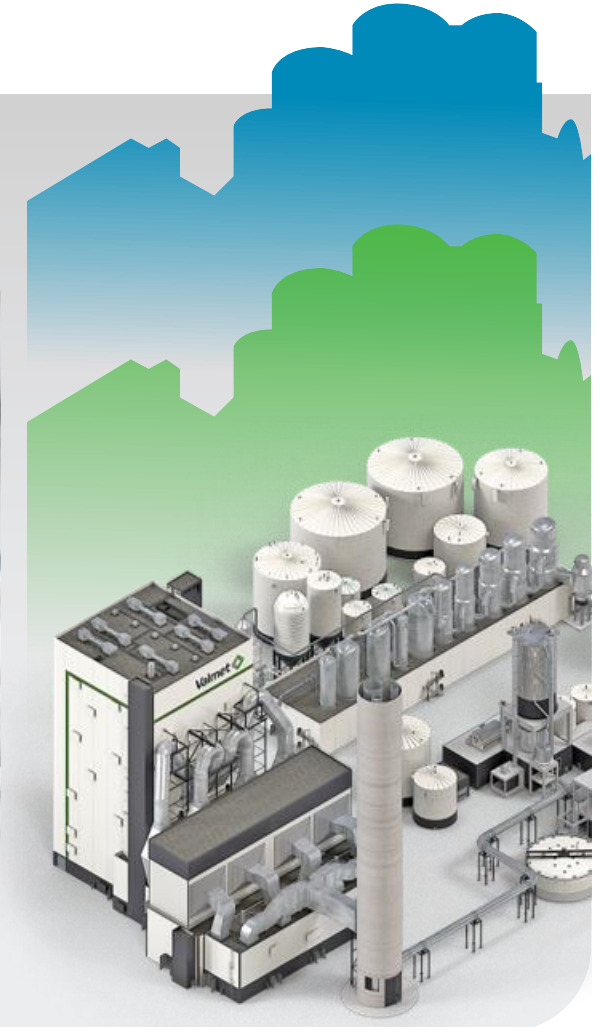
Endpoint protection like hardening, antivirus and whitelisting



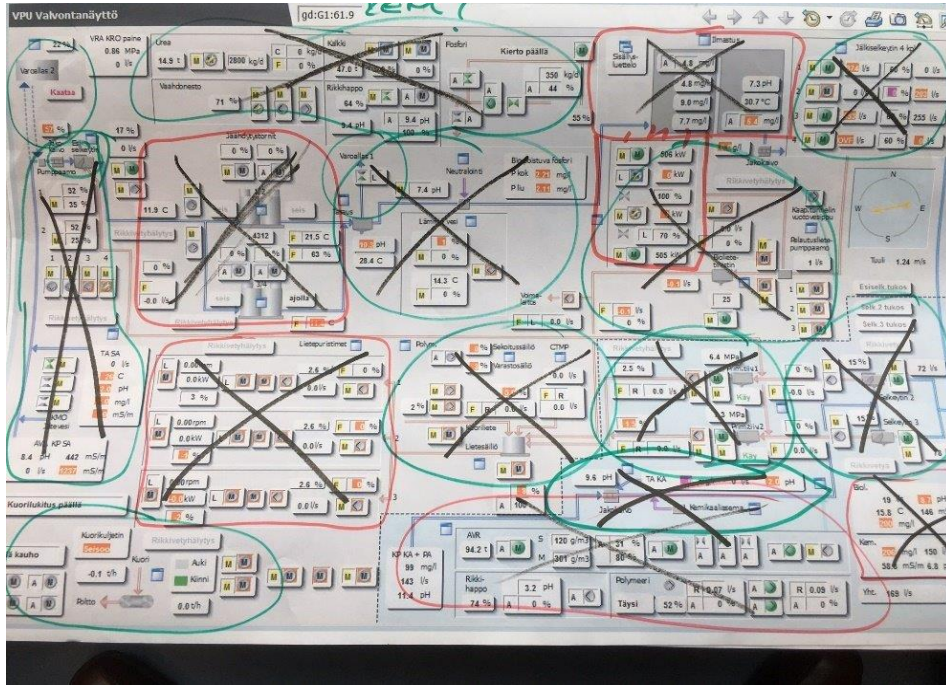
What about people?

Increased autonomy is changing the role of human operators

- Younger Generations needs are totally different. They need all the info on Fingertips for decision making
- With increased autonomy, the new gen mill operators' roles will evolve towards a mill orchestrator responsible for ensuring that different process areas perform well together, rather than for the details of how those processes are operated
- Data and analytics tools help to easily understand and optimize mill operations – and is easily available for all user groups
- People are focused on exceptions management and supervision – empowered by the supporting technology and tools.



An example of an UX design service project outcome



Old

- All available data
- Model of the process



New

- Tailored to support workflow and specific user groups
- Targets and limitations
- Current quality compared to the preferred quality
- Operating process efficiency
- Consequences of the user's actions

Fully web technology-based process control solution

Valmet DNAe User Interface

- Role based access to relevant information
- Access from any device regardless of physical location
- Scalability to accommodate growing number of system users and different control room concepts
- Seamless integration with Valmet cloud and Edge services
- Easy to learn for new generation of operators

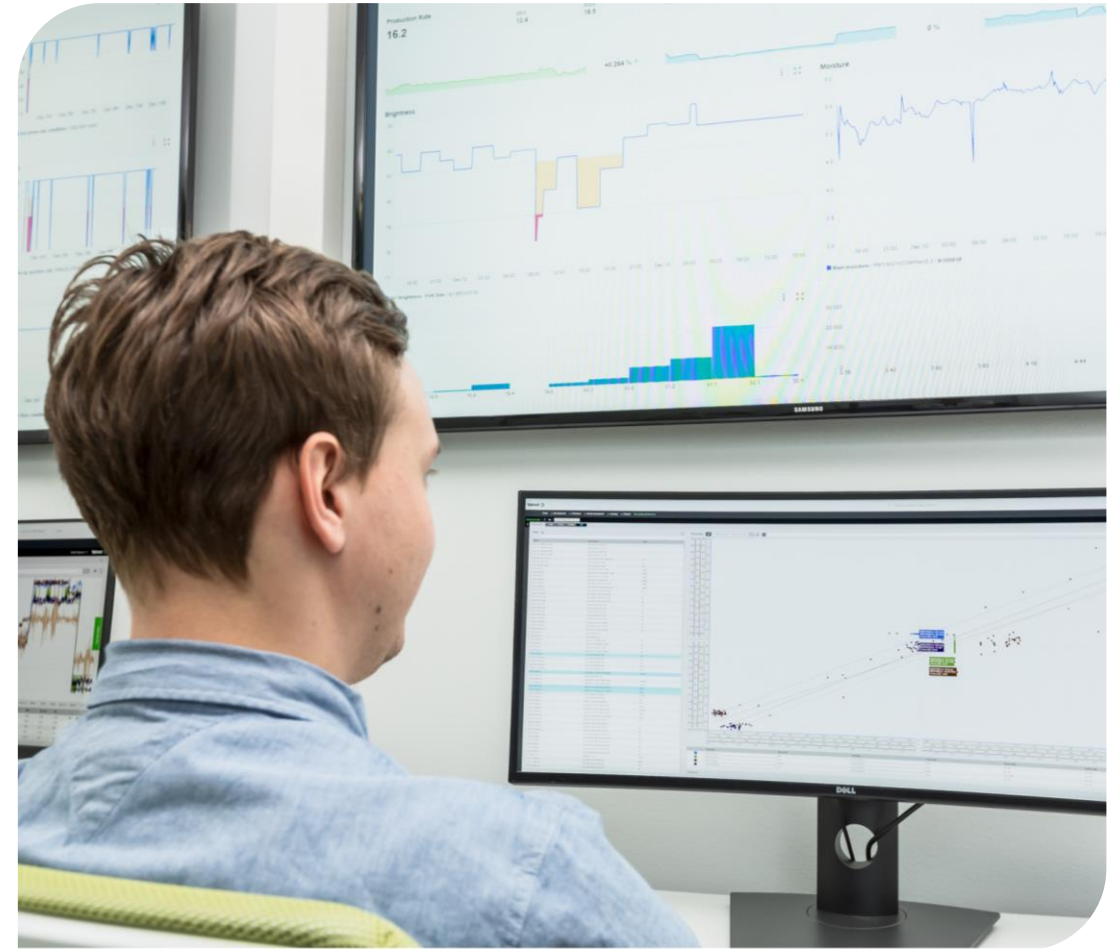


Valmet Self-service Analytics tools for process data analysis and visualization

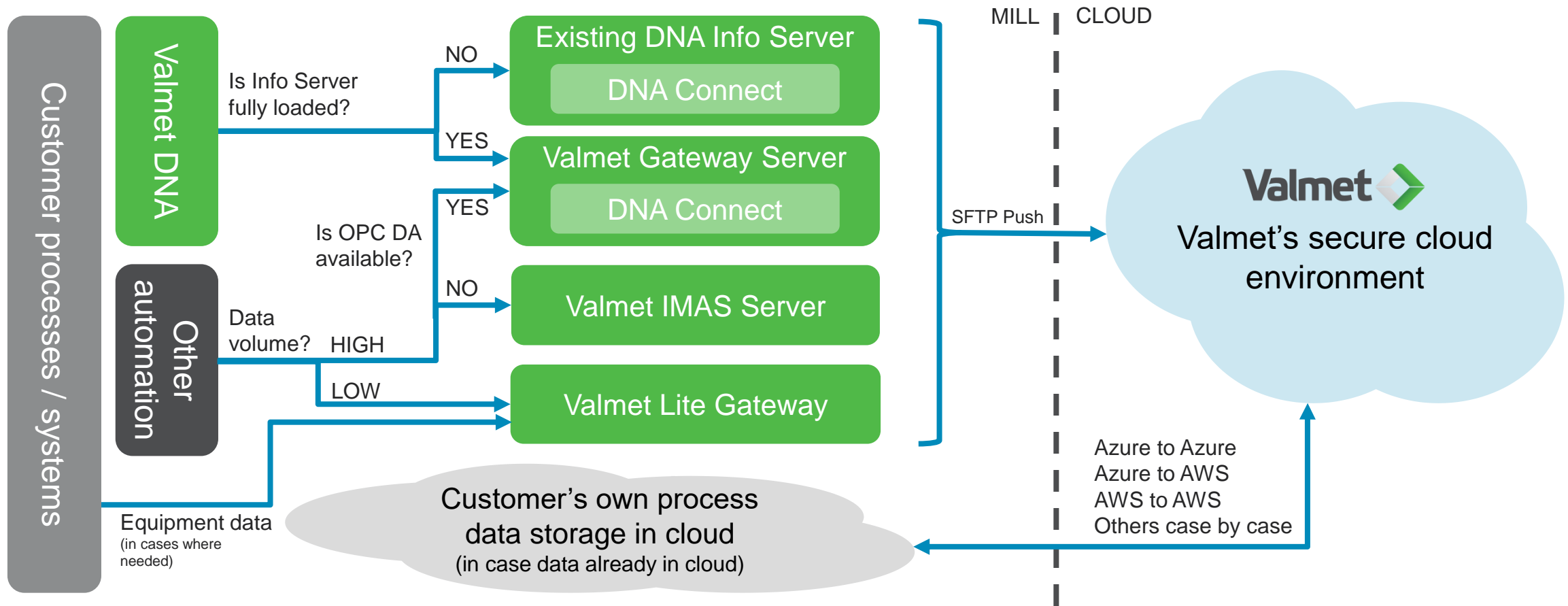
- Utilize self-service analytics tools for efficient process study and data visualization
 - Valmet Process Analysis Tool
 - Valmet Dashboard Creator for self-service data visualization
- The self-service analytics tools complement Valmet Industrial Internet (VII) applications
- You can access these tools and applications anywhere through Valmet Customer Portal or directly 24/7 from your control room

Benefits:

- Easy and fast data visualization and analysis for process data metrics follow-up, troubleshooting, and information sharing



Valmet Industrial Internet data connectivity solutions for customer process and equipment data



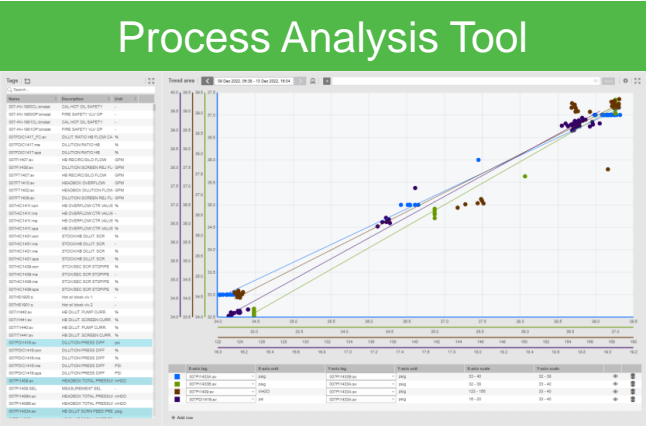
Connectivity solution is specified and related delivery limits are agreed during the sales phase!

Easy access to your applications and self-service analytics tools through 'My process performance' module in Valmet Customer Portal

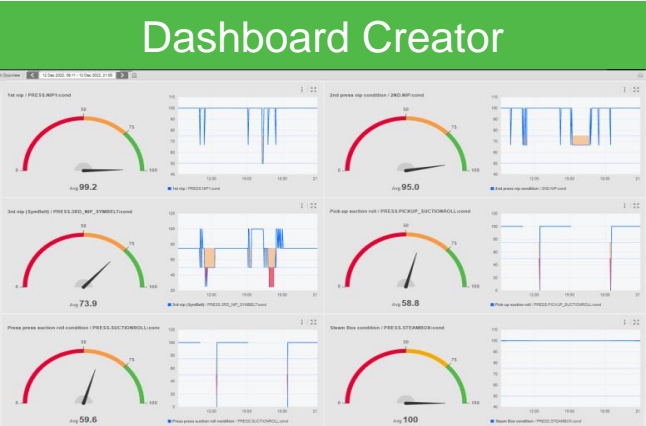
My process performance

Operations panel

Process Analysis Tool



Dashboard Creator



VII Applications



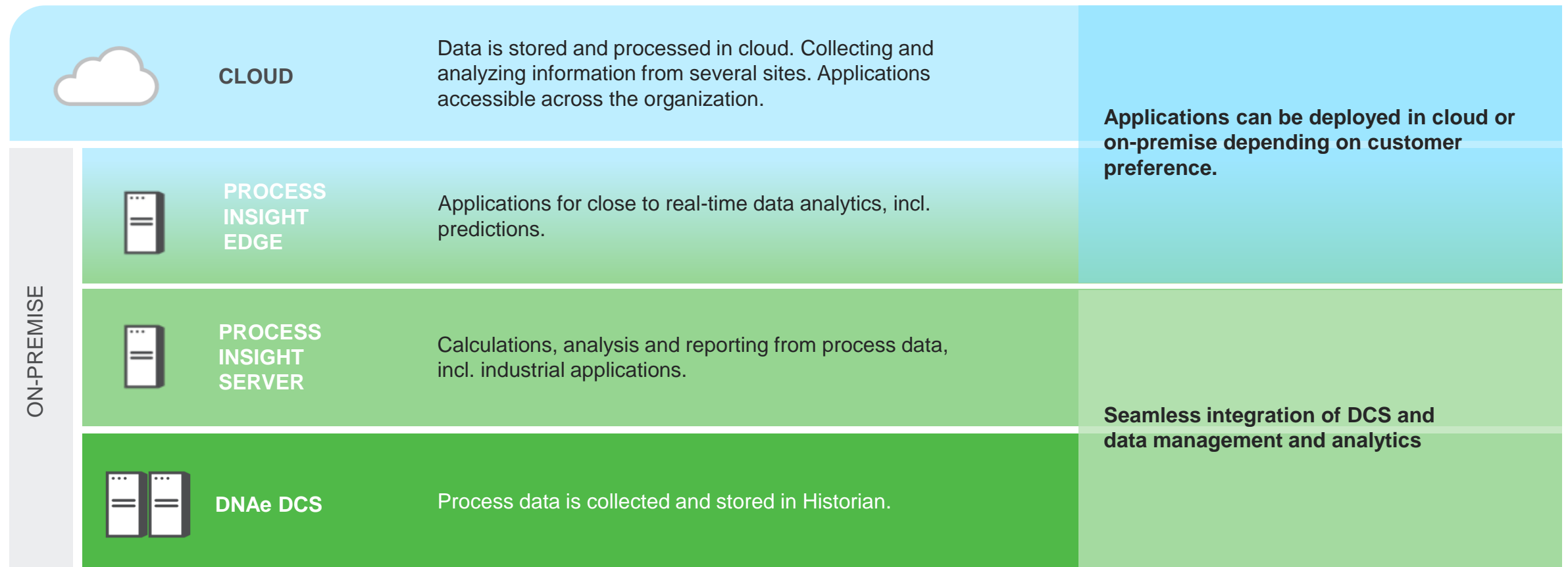
Data management & warehousing

Connectivity management



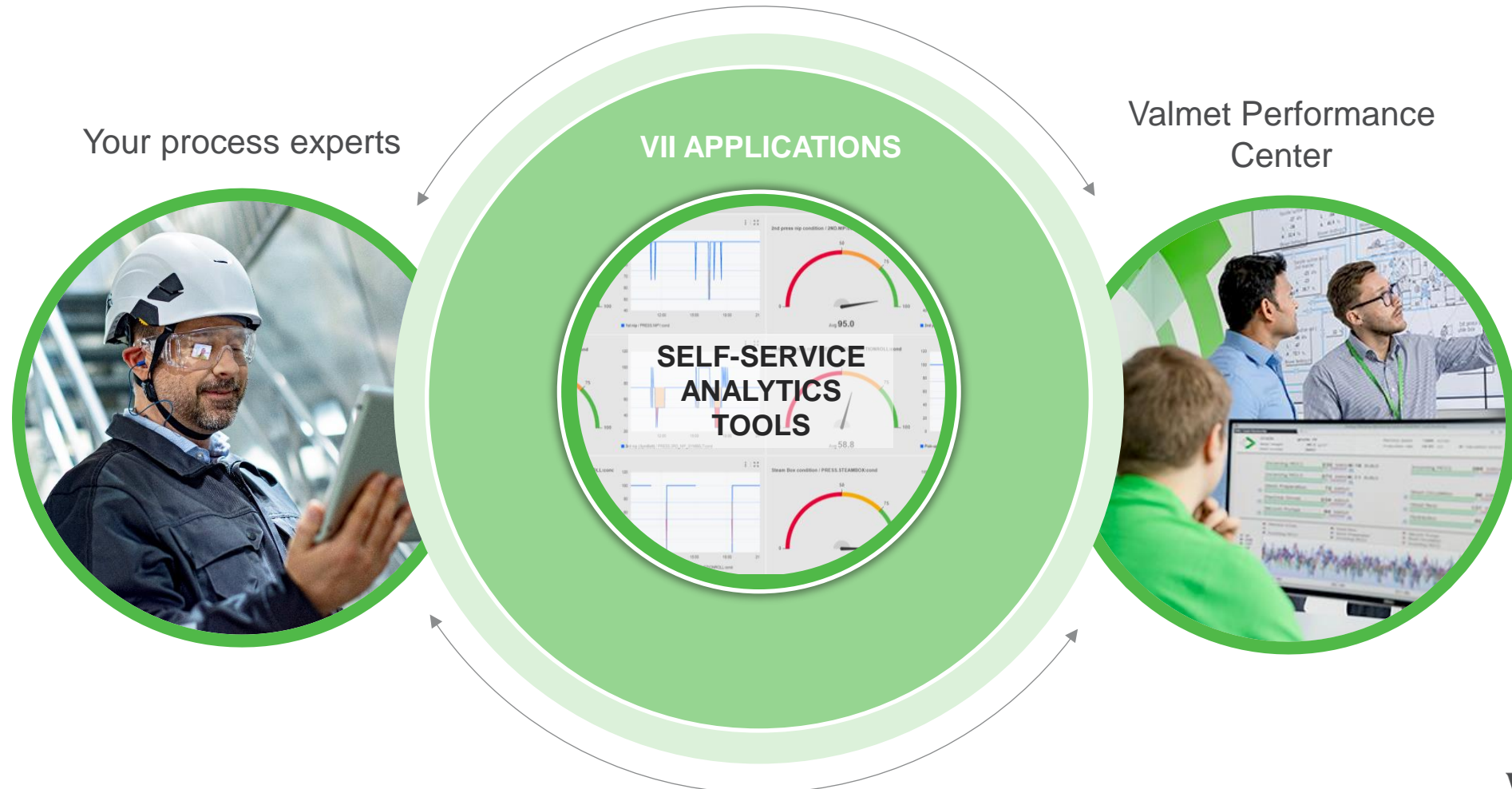
Scalable and flexible data management and analytics

On-premise(Edge Cloud) and cloud solutions



Self-service analytics tools offer powerful data visualization tool for communication and analysis

One view for more efficient support and collaboration



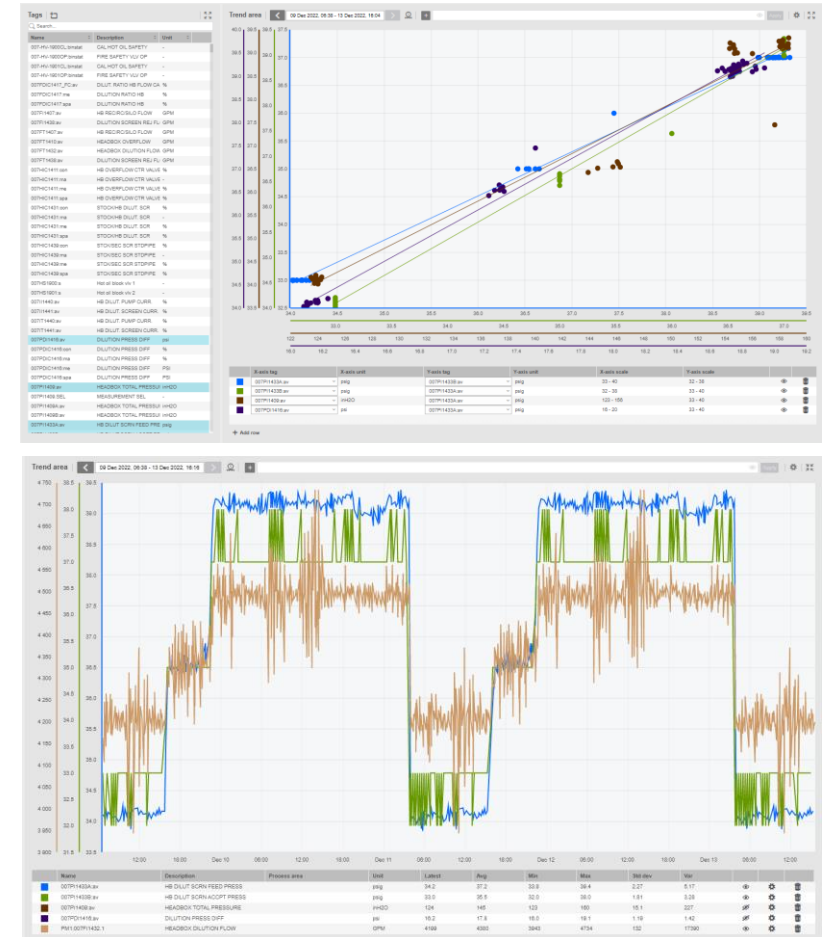
Valmet Process Analysis Tool

For efficient process analysis

- An easy-to-use trending, analysis and filtering solution for process studies
- Follow, study or troubleshoot processes by comparing different production levels, searching high peaks from data, studying long-term systemic changes and variations, and filtering unnecessary data away

Benefits:

- As the tool is easy to use, fast and can be used with all process data tags, it brings a strong asset to follow, study or troubleshoot processes



Valmet Dashboard Creator

For process data analysis and visualization

- A powerful self-service data visualization tool for communication and analysis
- You can easily create dashboards with graphical components for analysis and monitoring purposes

Benefits:

- You can create dashboards to follow up your metrics or KPIs in the long term or create quick views to study process deviations or identify root causes
- The dashboard views can be easily saved and shared to collaborate within the organization or with Valmet Performance Centers



Where to use the self-made dashboards?

- KPI dashboards for different purposes
→ Status, production, quality, maintenance
- Ad-hoc analytic views for e.g. process disturbance troubleshooting or process studies
- Continuous monitoring of the process by process specialists or Valmet Performance Center
- Monthly summaries
- Self-created meeting materials
- Collaboration via dashboards



Pulp and paper mill process optimizers

More than 30 years of experience

Causticizing Optimizer

Increased production rate **5-8%**

60+ references

Lime Kiln Optimizer

Decreased energy consumption **3-7%**

25+ references

Debarking Optimizer

Wood loss reduction **0.5-2%**

5+ references

Power Boiler Combustion Manager

Fuel cost decrease **2-10%**

Boiler efficiency increase

30+ references

Steam Network & Energy Manager

Ventilated steam production up to **95%**

HP Header variability reduction **50%**

15+ references

Recovery Boiler + ESP Power Optimizer

Increased production rate **1-3%**

Increase electricity production **1-4%**

50+ references

Evaporation Optimizer

Increased burning liquor

Dry solids **1-3%**

20+ references

Valmet IQ Optimizer (QCS)

Production increase up to **10%**

Less rejects in auto grade change up to **40%**

800+ references

130+ references

Pulp to Paper Optimizer

Strength variability reduction up to **35%**

Refiner specific energy savings up to **8%**

9+ references

Bleaching Optimizer

Brightness variation decrease **10-50%**

Bleaching chemicals savings **5-15%**

60+ references

Cooking Optimizer

Kappa variation decrease **20-60%**

Wood yield increase **0.5-1%**

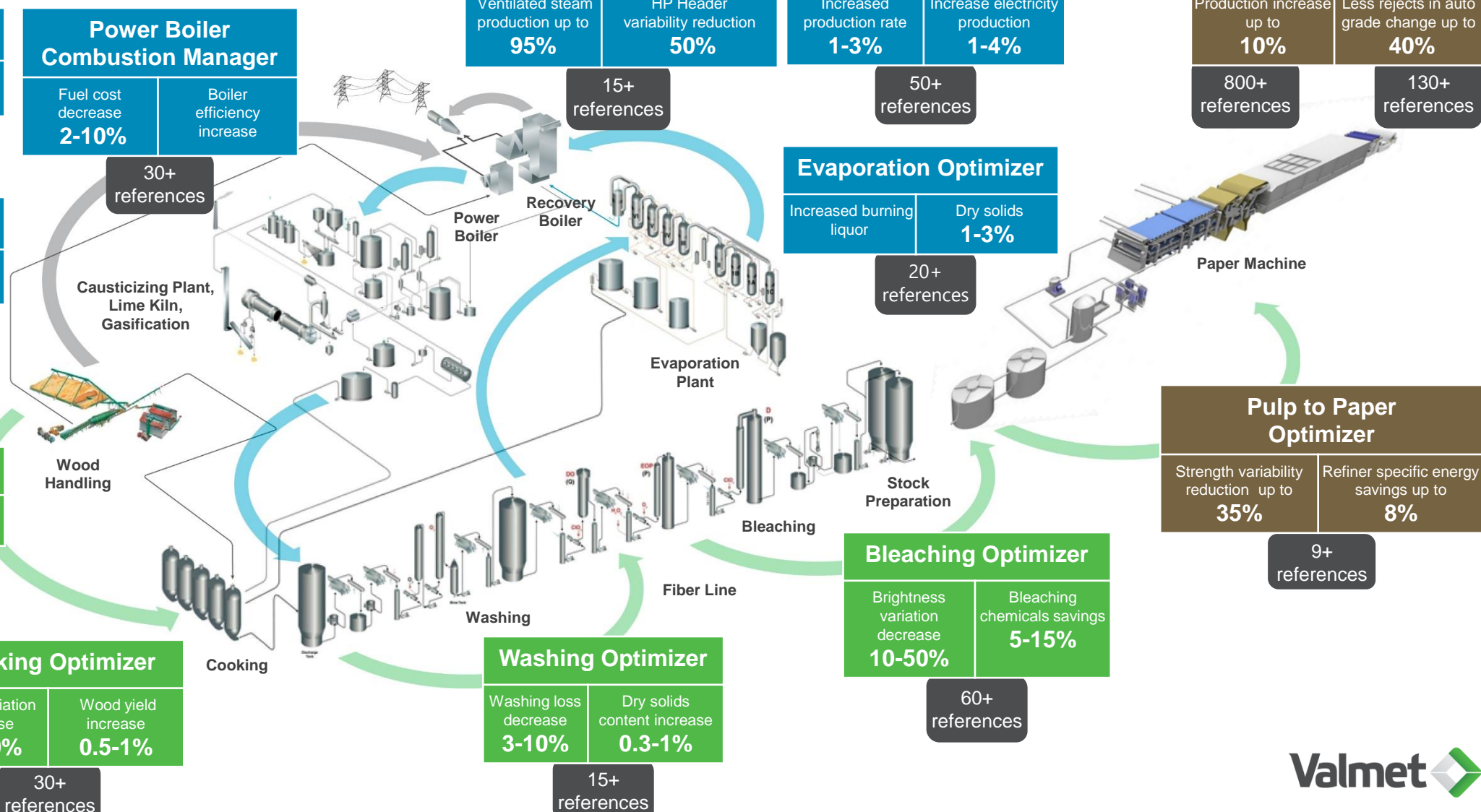
30+ references

Washing Optimizer

Washing loss decrease **3-10%**

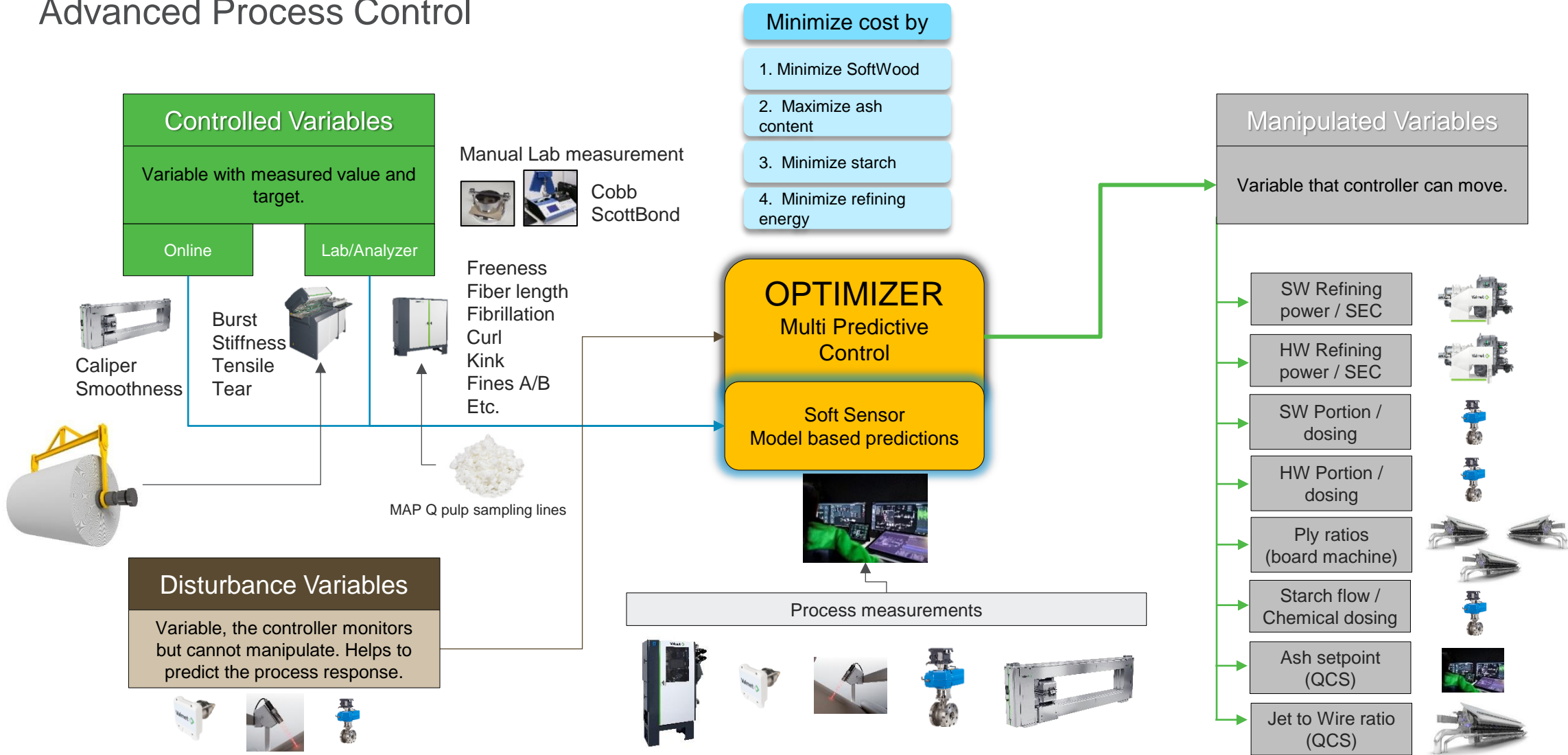
Dry solids content increase **0.3-1%**

15+ references



Pulp to Paper / Board Optimizer

Advanced Process Control



Experience control at every level and move your performance sustainably forward

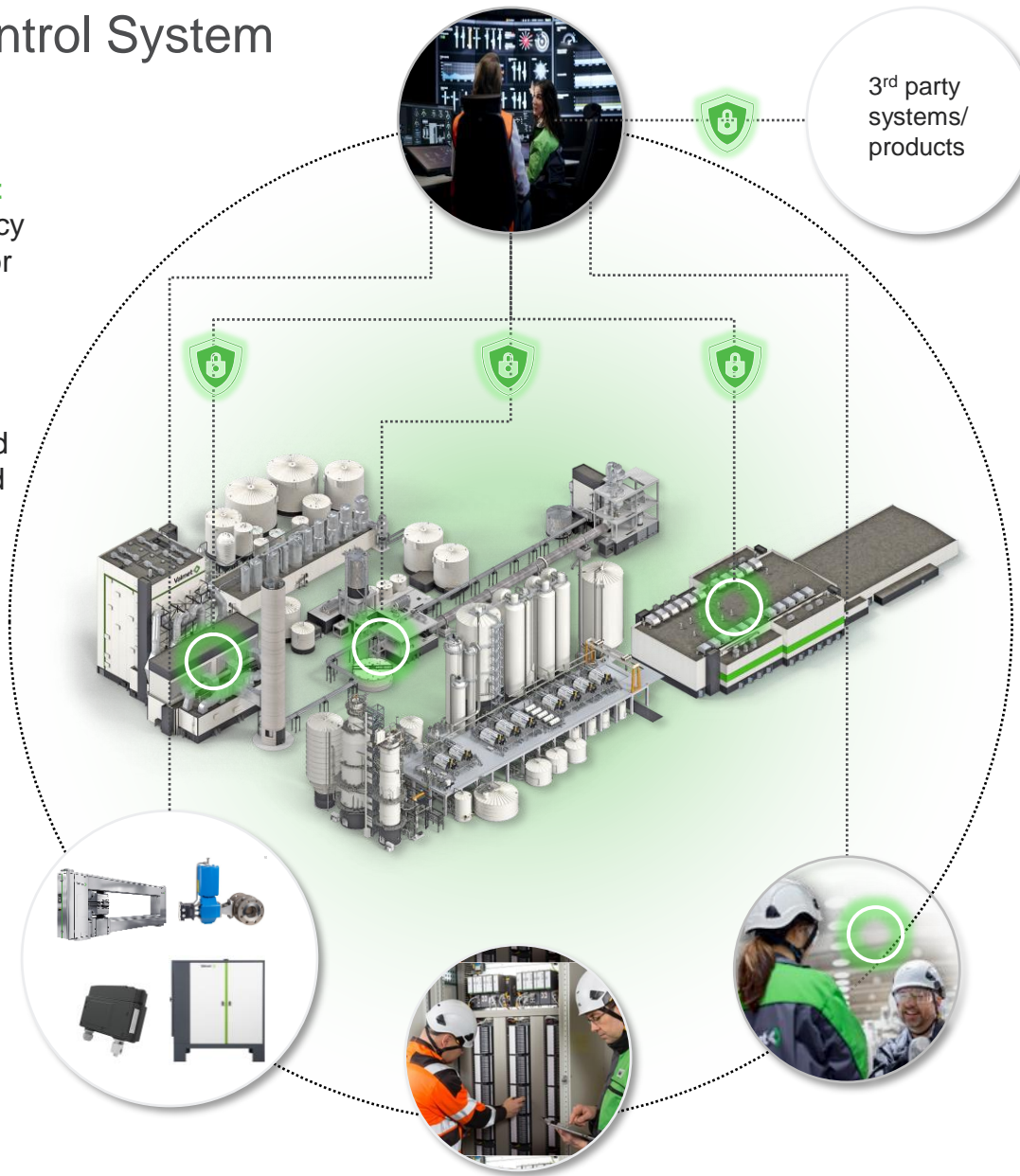
Valmet DNAe Distributed Control System

Empower your teams to perform at their best

- Operations concept designed to drive efficiency
- Easy to learn and use - unified, intuitive UX for all applications and user groups
- Global collaboration enabled - role-based secure access to system, support for remote and multi-site operations
- Analyze & predict process performance based on real-time and historical data with advanced analytics and reporting tools
- One engineering environment: easy to implement, configure and maintain

Reach your production performance, quality and environmental targets

- Reliable, high-performing controls with continuous, batch and advanced capabilities
- Optimization built-in: controls from basic to most advanced in the same system
- Industry specific application products and templates to meet your needs



Enable path towards autonomous operations of the future

- Benefit from the latest technology securely connecting OT and IT
- Solid foundation of data for further digitalization
 - Effective data management
 - Built-in, certified cybersecurity
 - Open connectivity to 3rd party systems, field and cloud

Evolve through the lifecycle with a committed partner

- Lifetime systems compatibility
- Guaranteed upgrade paths
- Lifecycle plans for predictable lifecycle costs
- Service agreements with long-term commitment and performance guarantees
- Expert support for continuous performance improvement

