The 3 Core Capabilities to Maximize Manufacturing Quality Performance
Why Quality Transformation Matters Now

MANUFACTURING CHALLENGES

- Global Economic Uncertainty
- Financial Constraints
- Supply / Demand Side Volatility
- International Trade
- Workforce Availability
- Sustainability
- Promiscuous Consumers

TECHNOLOGY OPPORTUNITIES

- Statistical Process Control
- Digitalization
- Quality Intelligence
- Smart Manufacturing
- Industry / Quality 4.0
- Connected Supply Chains
- Cloud / SaaS / Mobile
But ... what the reality still looks like today!
Operational Value of Quality Transformation

**DYSFUNCTIONAL DATA**
- Incomplete
- Inconsistent
- Isolated
- Inefficient

**Impaired Operational Visibility**
**Uninformed Decision-making**
**Quality Compliance Risks**

**IT & OPERATIONAL RESOURCE CHALLENGES**
Transformation Barriers

**ACTIONABLE INTELLIGENCE**
- Complete
- Consistent
- Unified
- Efficient

**enact**
**Complete Operational Visibility**
**Informed Decision-making**
**Quality Compliance Confidence**

**Best-in-class SPC Quality Intelligence in the Cloud**
Business Value of Quality Transformation

- **MINIMIZE COST**
  - Reduce Waste Across Man, Material, Machine
  - Streamlined Workforce
  - Improved Agility and Flexibility
  - Reduce Costs and Improve Profitability

- **MAXIMIZE VALUE**
  - Improve Customer Satisfaction and Brand Reputation
  - Support Knowledge and Information Workers
  - Improved Efficiency and Productivity
  - Improve Quality, Reliability, Safety & Consistency

- **MITIGATE RISK**
  - Achieve Sustainable Operations
  - Create standardized operating environment
  - Reduce Regulatory, Safety and Compliance Risks
  - Reduce Operational and Quality Risks

**PERFORMANCE**

**COMPLIANCE**
The 3 Core Capabilities to Maximize Manufacturing Quality Performance
Real-time data collection

# 1 Monitor
Real-time data collection

# 1 Monitor

Real-time notifications & workflows

# 2 Act
Real-time data collection

# 1
Monitor

Real-time notifications & workflows

# 2
Act

Centralized data & actionable intelligence

# 3
Learn
SPC quality intelligence in the cloud

Demonstrating the Capabilities in Action
Real-time data collection

# 1 Monitor
Real-time data collection

- Ubiquitous plant-wide data collection
- From materials receiving to finished goods dispatch
- From in-process to area-specific (such as laboratory)
- Product, process and environment data collections
Real-time data collection

- Visually Intuitive
- Easy to Use
- Real-time Feedback
- Optimized for Touch Screen
- Utilize Device Cameras

Measure the torque of three bottles using the torque meter. [http://www.mycompany.com/sop/torque]

Torque Check

<table>
<thead>
<tr>
<th>Torque</th>
<th>Piece 2 of 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.03</td>
<td></td>
</tr>
</tbody>
</table>

Filling Pre-Op Checks

This checklist is used at the beginning of each production run to verify the line is ready to run product.

1. Has all previous product been cleared from the line?
   - Acceptable
   - Unacceptable

2. Have all the appropriate dry/wet cleans been performed?
   - Acceptable
   - Unacceptable

3. Have all safety guards been replaced?
   - Acceptable
   - Unacceptable

4. Are you wearing all necessary personal protection equipment (PPE)?
   - Acceptable
   - Unacceptable
     - Out of large size gloves.

5. Indicate any areas that are unsatisfactory (select all that apply).
   - All Areas Acceptable
   - Cap Sealer
   - Filling Carousel
   - Staging Area
   - Testing Bench
Real-time data collection

- Data Collection Compliance
- Confidence in Quality
- Plan Compliance
- Operator Efficiency

TIMED DATA COLLECTIONS
Real-time data collection

- Prevents Operator Overload
- Focuses Attention on what Matters Most
- Supports Rapid Scalability

Tailored Interface

Dashboard

- Manufacturing Limit Violation
  - Filling Line 01-Brix Above USL
    - 4m AGO
- Statistical Violation
  - Filling Line 03-Density Below UCL
    - 16m AGO
- Manufacturing Limit Violation
  - Filling Line 02-CO2 Above USL
    - 1h AGO
- Manufacturing Limit Violation
  - Filling Line 04-pH Above USL
    - 2h AGO
- Manufacturing Limit Violation

VIEW ALL (8)

Beverage Checks - Filling Line 01
- Adam Murray
  - 4m AGO

TOA Check - Filling Line 01
- Adam Murray
  - 8m AGO

Package Inspection - Filling Line 01
- Adam Murray
  - 11m AGO
Real-time data collection

- Increases Operator Efficiency
- Prevents Keying Errors
Real-time data collection

- Increased Efficiency
- Increased Accuracy
- Increased Responsiveness
Real-time data collection

✓ Real-time Data Transformation
✓ Operator Efficiency
✓ Standardized Methods
✓ Highly customizable

Real-time Data Transformation
Operator Efficiency
Standardized Methods
Highly customizable

Filled Weight → Net Volume

\[
\text{Net Volume} = \frac{\text{Filled Weight} - \text{Tare Weight}}{\text{Density}}
\]

\[
\begin{align*}
\text{Filled Weight} & = 537.98g \\
\text{Tare Weight} & = 14.77g \\
\text{Density} & = 1.045 \text{ g/ml}
\end{align*}
\]

\[
\text{Net Weight} = \frac{537.98g - 14.77g}{1.045 \text{ g/ml}} = 523.21g
\]

\[
\text{Net Volume} = \frac{523.21g}{1.045 \text{ g/ml}} = 500.68ml
\]

| STEP 1 | +  
|--------|-----
| Filled Weight (✔️, ✔️) - Tare Weight (✔️, ✔️) = Net Weight |
| STEP 2 | +  
| Net Weight / Density (✔️, ✔️) = Net Volume |
Real-time data collection

- Provides native language support
- Supports multi-national manufacturers
- User interface translations
- Metadata translations

**Torque Check**

Measure the torque of three bottles using the torque meter. [http://www.mycompany.com/sop/torque](http://www.mycompany.com/sop/torque)

**Chequeo de Torque**

Mida el torque de tres botellas usando el medidor de torque. [http://www.mycompany.com/sop/torque](http://www.mycompany.com/sop/torque)
Real-time notifications & workflows

# 2

Act
Real-time notifications & workflows

App Notifications
Real-time notifications & workflows

App Notifications
Real-time notifications & workflows

- App Notifications
  - Manufacturing limit violation
  - Statistical violation
Real-time notifications & workflows

- App Notifications
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  - Statistical violation
Real-time notifications & workflows

- App Notifications
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Real-time notifications & workflows

- App Notifications
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  - Statistical violation
Real-time notifications & workflows

- Manufacturing limit violation
- Statistical violation

Manufacturing Limit Violation
Filling Line 01-Net Volume Above USL
1m AGO

Statistical Violation
Filling Line 01-Net Volume Above UCL
12m AGO
Real-time notifications & workflows

- App Notifications
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Real-time notifications & workflows

- App Notifications
  - Manufacturing limit violation
  - Statistical violation
  - Checklist violation
Real-time notifications & workflows

✅ App Notifications
- Manufacturing limit violation
- Statistical violation
- Checklist violation

Checklist Violation
Filling Pre-Op Checks > 0
28m AGO
Real-time notifications & workflows

- App Notifications
  - Manufacturing limit violation
  - Statistical violation
  - Checklist violation
Real-time notifications & workflows

✅ App Notifications
- Manufacturing limit violation
- Statistical violation
- Checklist violation
- Timed data collections

Dashboard

- Manufacturing Limit Violation
  - Filling Line 01-Net Volume Above USL
    - 1m AGO
- Statistical Violation
  - Filling Line 01-Net Volume Above UCL
    - 12m AGO
- Checklist Violation
  - Filling Pre-Op Checks > 0
    - 28m AGO
- Data Collection - Missed
  - Torque Check for Filling Line 01
    - 40m AGO
- Data Collection - Due
  - Torque Check for Filling Line 01
    - 45m AGO
Real-time notifications & workflows

App Notifications
- Manufacturing limit violation
- Statistical violation
- Checklist violation
- Timed data collections
Real-time notifications & workflows

- App Notifications
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  - Checklist violation
  - Timed data collections
Real-time notifications & workflows

- App Notifications
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  - Timed data collections

Data Collection - Due
Torque Check for Filling Line 01
45m AGO

Data Collection - Missed
Torque Check for Filling Line 01
40m AGO
Real-time notifications & workflows

- App Notifications
  - Manufacturing limit violation
  - Statistical violation
  - Checklist violation
  - Timed data collections
You have a new event review for a manufacturing limit violation:

**Process:** Filling Line 01
**Feature:** Net Volume
**Violation:** Above USL

To view additional details, please click on the link below.

[VIEW EVENT DETAILS] [VIEW CONTROL CHART]
Real-time notifications & workflows

App Notifications
Email Notifications

To: Quality Supervisor
From: Enact Operations

You have a new event review for a manufacturing limit violation.

Process: Filling Line 01
Feature: Net Volume
Violation: Above USL

To view additional details, please click on the link below.

VIEW EVENT DETAILS  VIEW CONTROL CHART
To: Quality Supervisor
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You have a new event review for a manufacturing limit violation:

**Process:** Filling Line 01
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From: Enact Operations

You have a new event review for a manufacturing limit violation:

Process: Filling Line 01  
Feature: Net Volume  
Violation: Above USL

To view additional details, please click on the link below.

VIEW EVENT DETAILS  
VIEW CONTROL CHART
Real-time notifications & workflows

- App Notifications
- Email Notifications
- Event Responses
  - Actions
  - Photos
  - Comments

Event Details

4m LATER

4m LATER

JUST NOW

Fill head 15 adjusted.

Faulty head (Root Cause)

9/30/2019 1:56:20 PM

Manufacturing Limit Violation
Event Type: Above USL
Process: Filling Line 01
Feature: Net Volume

Value: 366.21
USL: 365
Part: GLS - CHERRY SODA - 355 ML
Real-time notifications & workflows

- App Notifications
- Email Notifications
- Notification API
Centralized data & actionable intelligence

# 3
Learn
Centralized data & actionable intelligence

Compliance
Centralized data & actionable intelligence

Compliance
- Pareto chart

Pareto Chart (Collected Data)

<table>
<thead>
<tr>
<th>Category</th>
<th># Total</th>
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<tbody>
<tr>
<td>Packaging Department</td>
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<tr>
<td>Packaging Line 01</td>
<td>60</td>
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<tr>
<td>Packaging Line 02</td>
<td>60</td>
</tr>
<tr>
<td>Packaging Line 03</td>
<td>35</td>
</tr>
</tbody>
</table>
Centralized data & actionable intelligence

Compliance - Pareto chart

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Compliance
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Centralized data & actionable intelligence

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Levels:
1. Level
2. Collection Name
3. Shift
## Compliance (Data Collections)

<table>
<thead>
<tr>
<th>Category</th>
<th># Total</th>
<th># Active</th>
<th>Missed</th>
<th>Completed</th>
<th>Late</th>
<th>On-Time</th>
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<td>13</td>
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<td>Packaging Line 01</td>
<td>60</td>
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<td>0</td>
<td>60</td>
<td>4</td>
<td>56</td>
</tr>
<tr>
<td>Packaging Line 02</td>
<td>60</td>
<td>0</td>
<td>5</td>
<td>55</td>
<td>9</td>
<td>46</td>
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<td>0</td>
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Centralized data & actionable intelligence

- Compliance
- Analytics
  - Capability
  - Box & Whisker chart
**Centralized data & actionable intelligence**

- **Compliance**
- **Analytics**
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  - Box & Whisker chart

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**Box & Whisker Chart**

<table>
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<th>Category</th>
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<tr>
<td>Brix</td>
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<td>4009</td>
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<td>Torque</td>
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**Levels:** 1. Feature » 2. Level 8 » 3. Part
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**Centralized data & actionable intelligence**

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19m AGO  
Net Volume: 245  
83/245  
5/82

24m AGO  
Net Volume: 252  
71/252  
5/84

36m AGO  
Net Volume: 252  
51/252  
4/84

37m AGO  
Net Volume: 252  
22/252  
2/84

1h AGO  
Brix: 82  
6/82  
1/82

2h AGO  
Brix: 82  
5/82  
0/82

COCA - COLA  
0.5L  
0.375L  
1.0L  
2.0L

Centralized data & actionable intelligence

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Centralized data & actionable intelligence

- Compliance
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<table>
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<tr>
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<th>Wall Thickness</th>
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<td>C1</td>
<td>B1</td>
<td>A2</td>
</tr>
<tr>
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<td>B2</td>
<td>B2</td>
<td>C1</td>
<td>A3</td>
</tr>
<tr>
<td>Bucharest</td>
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<tr>
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Centralized data & actionable intelligence

- Compliance
- Analytics
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- Box & Whisker chart
- Stream Grading
Centralized data & actionable intelligence

- Compliance
- Analytics
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- Stream Grading

---

**Site Summary**

<table>
<thead>
<tr>
<th>Sites(s)</th>
<th>Brix</th>
<th>Caffeine</th>
<th>Net Volume</th>
<th>Wall Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berlin</td>
<td>C2</td>
<td>C1</td>
<td>B1</td>
<td>A2</td>
</tr>
<tr>
<td>Brussels</td>
<td>B2</td>
<td>B2</td>
<td>C1</td>
<td>A3</td>
</tr>
<tr>
<td>Bucharest</td>
<td>A3</td>
<td>A1</td>
<td>C1</td>
<td>C2</td>
</tr>
<tr>
<td>Budapest</td>
<td>C1</td>
<td>A2</td>
<td>C2</td>
<td>A3</td>
</tr>
<tr>
<td>London</td>
<td>C2</td>
<td>C3</td>
<td>C1</td>
<td>C2</td>
</tr>
<tr>
<td>Madrid</td>
<td>A2</td>
<td>B2</td>
<td>A3</td>
<td>C1</td>
</tr>
<tr>
<td>Paris</td>
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<td>B2</td>
<td>C1</td>
<td>B1</td>
</tr>
<tr>
<td>Prague</td>
<td>B1</td>
<td>A2</td>
<td>C2</td>
<td>A1</td>
</tr>
<tr>
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<td>A3</td>
<td>C1</td>
<td>A3</td>
</tr>
<tr>
<td>Sofia</td>
<td>C1</td>
<td>A2</td>
<td>B1</td>
<td>A3</td>
</tr>
<tr>
<td>Vienna</td>
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<td>B1</td>
<td>C1</td>
<td>C2</td>
</tr>
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<td>Count</td>
<td>Mean</td>
<td>Pp</td>
<td>Ppk</td>
<td>% OOS</td>
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<td>10.45</td>
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<td>1.11</td>
<td>4.42</td>
<td>7.63</td>
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<td>1.16</td>
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<td>1.33</td>
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</table>

Centralized data & actionable intelligence

- Compliance
- Analytics
  - Capability
  - Box & Whisker chart
- Stream Grading
# Centralized data & actionable intelligence

- **Compliance**
- **Analytics**
  - Capability
  - Box & Whisker chart
- **Stream Grading**

<table>
<thead>
<tr>
<th>Category</th>
<th>Piece Count</th>
<th>Yield Potential (Centered Process)</th>
<th>Yield Performance</th>
<th>Expected Yield</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Grade</td>
<td>Percentage</td>
<td>Grade</td>
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<tr>
<td>Caffeine</td>
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<td>C3</td>
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</tr>
<tr>
<td>LN - Filling Line 01</td>
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<tr>
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<tr>
<td>SODAZS 2L</td>
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<td>A1</td>
<td>High</td>
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<tr>
<td>DIET SODA 2L</td>
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<td>C2</td>
<td>Low</td>
<td>99.65%</td>
</tr>
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<tr>
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<td>A3</td>
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</tbody>
</table>
SPC quality intelligence in the cloud
Enact Summary

Enact provides significant value to our clients:

• Real-time data collection
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Enact provides significant value to our clients:

- Real-time data collection
- Real-time notifications and workflows
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- Real-time data collection
- Real-time notifications and workflows
- Centralized data & actionable intelligence
- Powered by SPC Quality Intelligence
Thank You!

Jason Chester
Advantive
jason.chester@advantive.com