Nov 2024

**WATS Feature Release Note
Unit Flow (Beta) 25.1.R1**

Major Feature Areas
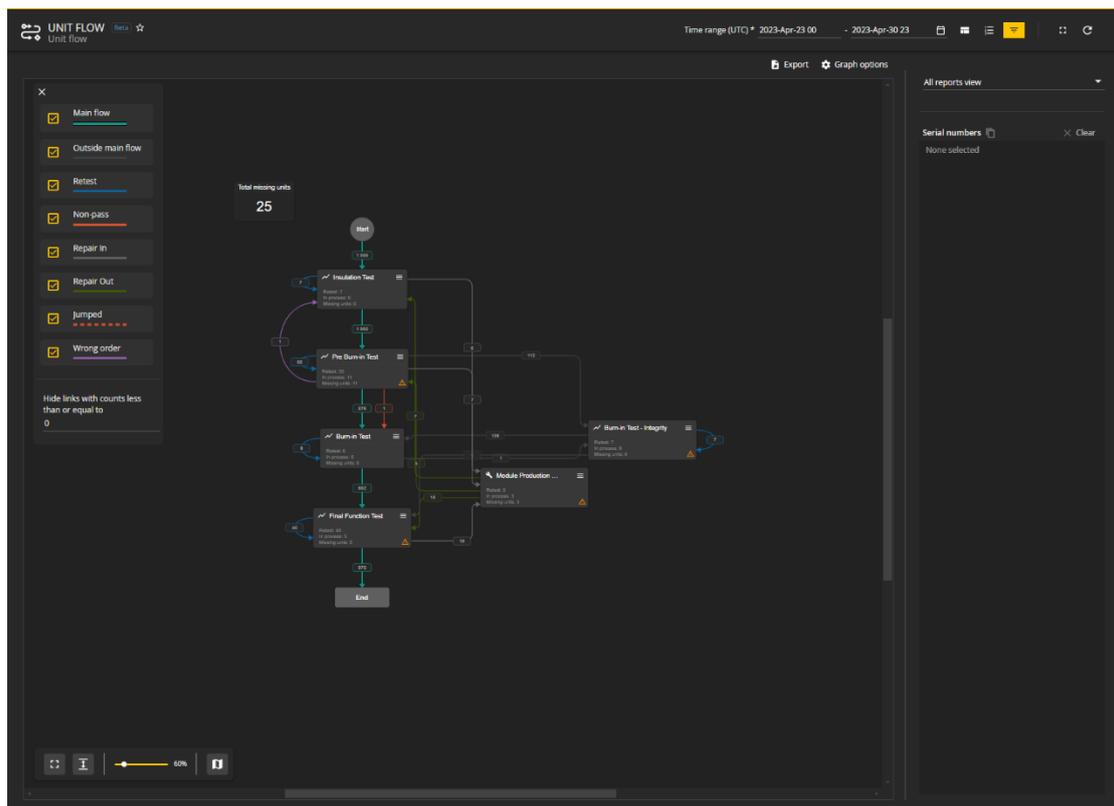
Unit flow

The new Unit flow module offers enhanced visibility into unit movement across the production line, providing users with a flexible overview to visualize and analyse production data from multiple perspectives.

This feature is currently in beta and available exclusively to select customers. For early access, please contact sales@virinco.com

How to navigate to the Unit flow module

Users can access the Unit flow module through:
- **Analytics navigation menu**: Locate the Unit Flow option in the Manufacturing Insight area under "Flow view" in the Analytics section.
- **Drill down from Process heatmap**: From the Process heatmap module, click on the Unit flow icon after selecting a row to view detailed flow data.

Key features

Filtering options
- **Unit flow filter**: Located in the toolbar, this filter allows users to specify criteria such as serial number, part number, process, and time range. Once applied, the filter displays the full flow for units matching the selected criteria.

Flow tracking

The module sequences each unit's progress across processes, consolidating retests and providing a detailed view of each unit's journey.

- o **Start**: Displays the number of unique units entering a process.
- o **End**: Shows unique units existing in the process. This may remain blank if data is incomplete.
- o Both **Start** and **End** counts reflect unique units, regardless of the selected view and option

This accurate tracking approach helps users identify incomplete or irregular flows within production.
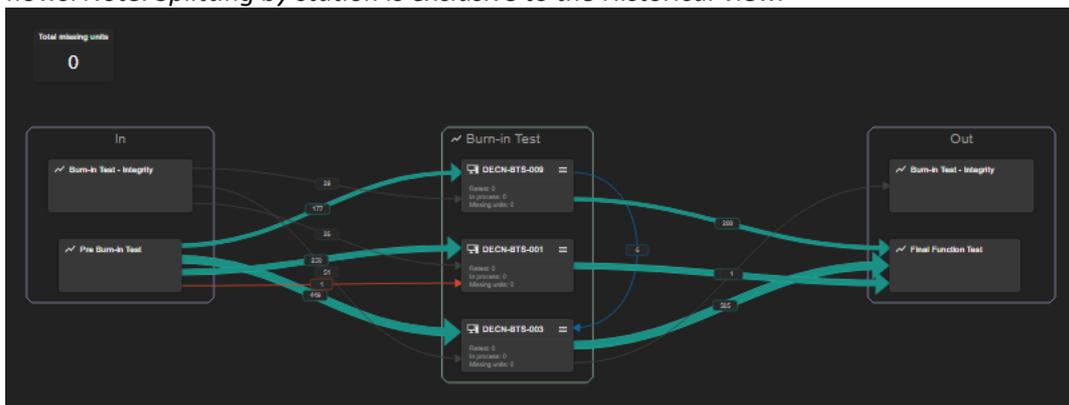
Views

Historical view

Displays all processed units, including retests, with options for detailed analysis:

- Users can analyze the flow based on either **reports** or **unique units**, allowing for flexible and precise evaluation of production data. In both Current View and Time View, the count is set to Reports by default, ensuring consistent real-time and temporal data tracking.
- **Drill down**: Double-click a link or node or use the "Split by stations" menu to break down data by station.
  - o **Split by station**:
    - **From a link**: Separates source and target processes into individual stations.
    - **From a node**: Isolates a process into stations while keeping other processes intact.

The top three production streams are visually emphasized, aiding quick identification of key flows. *Note: Splitting by station is exclusive to the Historical view.*

Current view

Shows the current location of units in the production line, predicting their next steps based on established flow patterns.

Time view

Provides a comprehensive time analysis for each stage:

- **Execution times**: Includes time taken within and between processes, displayed as median by default (with options for min, max, and average).
- Hover over nodes or links to view detailed time statistics.

Time is calculated per entry, ensuring accuracy by deriving the median from individual time spans rather than the total duration.
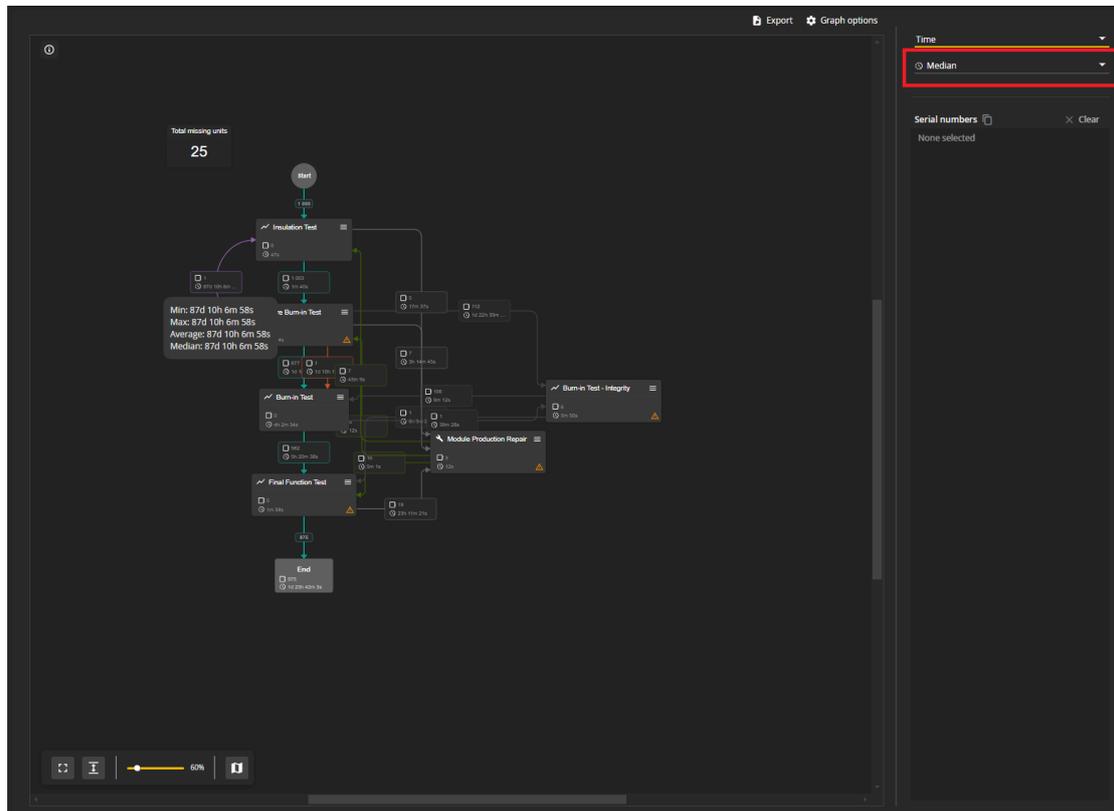
Link types and flow indicators

The Unit flow module uses various link types to represent unit movements within and outside main production flows:

- **Main flow**: Standard production sequence.
- **Outside main flow**: Units entering/exiting external processes.
- **Non-pass**: Units progressing without meeting criteria.
- **Repair in/out**: Tracks units undergoing maintenance.
- **Jumped**: Indicates skipped processes.
- **Wrong order**: Highlights deviations from expected sequence.
- **Retest links**: Units that have undergone retesting within a station or process.

Additional views feature specific link types, such as **Passed units** (Current process view), providing detailed tracking and analysis of production flows.

Retest tracking

Retest Tracking Behavior
- In the **Reports** option of the Historical view, retest counts each subsequent test in the same process after the first, each time the unit enters the process.
- In the **Units** option of the Historical view, retest counts each unit that has been tested multiple times in a row in the same process.
- The **total number of retests** is determined by the **total count of all retest links**.

Process-Level vs. Station-Level Retest Counts
The retest count differs between process-level and station-level views to provide more granular tracking:
- **Process-Level (Historical View):** Retests are counted at the process level.
  - If a unit is tested in process A, then B, then A, that does not count as retest.
  - If a unit is tested in process A, then A, then B, then A, then A, then A, that counts as 3 retests in process A.
    - With the **Units** option it is counted as "1 unit has been retested".
- **Station-Level (Split-by-Station View):** Retests are counted separately at each station, offering a more detailed view of retest activity per station within a process.
  - Within the same process, if the unit is tested on station A, then B, then A, that does not count as retest, even though in Process-level view it was retested twice.
  - Within the same process, if the unit is tested on station A, then A, then B, then A, then A, then A, that counts as 3 retests on station A; but counts as 5 retests in Process-level view.

This approach supports a comprehensive analysis of unit performance across both processes and individual stations, enabling users to assess retests accurately at multiple levels.

Unit tracking by serial number

Users can click on units to retrieve serial numbers, displayed in the graph settings. Selecting a serial number highlights the unit's complete production journey, allowing in-depth tracing and analysis. Regardless of the selected view or option, the feature always returns **unique serial numbers** for consistency and accuracy. Serial numbers are copyable for further reporting.
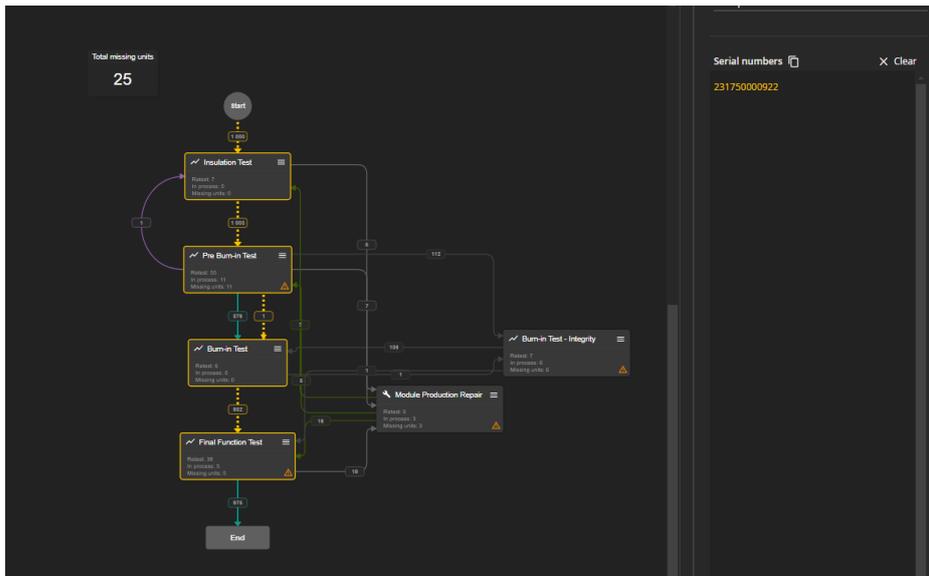
Analysis and interaction

Analyze data using the graph's interactive features:

- **Link labels and node menu**: Click labels or open the node menu for analysis options.
  - **Analyze with units in process**: Re-filter current data to focus on specific units.

These tools enable precise examination of unit flows and data points.

Customization and export options

Customize and export the Unit Flow graph with the following options:

- **Graph direction**: Adjust graph orientation via the Graph Options menu.
- **Export**: Save the graph as PNG for easy sharing and reporting.
- **Link options**: Refine data visibility by hiding or highlighting specific links.
- **Graph navigation**: Navigate using the toolbar at the bottom left for full-screen view, zoom, and mini map access.

These customization options allow users to tailor the graph for targeted analysis and export findings with ease.

This update significantly enhances tracking, analysis, and customization, empowering users to monitor production flows, identify deviations, and gain actionable insights into unit movement and efficiency across the production line.