ABOUT N4 RELEASE 3.3

Navis N4 release 3.3 is now generally available. This new release of N4, built following the agile methodology, provides a new set of features and enhancements for improved efficiency and productivity, including better yard utilization through optimized decking performance, improved rail workflows for terminals using wide span gantry cranes serviced by straddle carriers and empty handlers, core performance improvements in XPS and new features that make it easier to administer & maintain N4. The following provides an overview of the key enhancements introduced in N4 3.3. For more technical details on this release, please consult the N4 3.3 Release Notes.

AGILE METHODOLOGY

As part of N4 3.3, Navis has implemented a major improvement in our software development approach, following an agile methodology which will improve our ability to build quality software and innovate by utilizing rapid feedback loops as part of our software development cycle. Our teams are aligned by customer value areas and there are frequent quality and delivery checkpoints built into the process. In addition, we have reduced our release cycles to 4 months in order to be more responsive to market needs.

OPERATIONS IMPROVEMENTS AND ENHANCEMENTS

Block Impact Minimizer

N4 3.3 the Block Impact Minimizer (BIM) optimizes the loading of empty containers to vessels by swapping empties from different yard blocks. This ensures the empty work load is distributed across the various blocks, minimizing transfer zone congestion and decreasing unproductive container moves resulting in higher yard and quay-side productivity.

The BIM algorithm swaps the work instructions of empty containers in a high impact block, where the demand exceeds ASCs capacity, for the work instructions of empty containers in a low impact block where the ASCs have spare capacity. BIM takes into account rehandles, tier height and empty container distribution in the blocks. In addition to swapping empty containers, BIM can be configured to analyze and swap work instructions for full containers. The Block Impact Minimizer delivers the following benefits:

- Reduces congestion at the water side transfer zones. BIM swaps work instructions between ASC blocks to ensure that ASCs can always receive or deliver containers on time.

- Reduces the number of rehandles. BIM identifies and selects containers to ensure that the total number of rehandles in the loadout operations is lessened.

- Attempts to keep stacks low. BIM reviews containers with fewer rehandles first, and when two work instructions have the same number of rehandles, BIM strives to keep the stacks low. Containers on higher stacks are consistently promoted for earlier loading and as time progresses, the entire vessel operations should be performed with lower stacks.

- A new Swapping History tab provides entries for each completed BIM swap to track system decisions and increase performance by making troubleshooting easier. The history identifies why a swap was made and provides the most important container swapping attributes.

BIM can be coordinated with other Decking and Scheduler problem solutions to improve and refine a certain operational window before jobs are executed by yard cranes.

Decking History Insights

Decking history provides users with better insights into system decisions to fine tune parameters and increase yard utilization.

For those using Expert Decking and/or N4 Decking, the Decking History feature enables users to view and analyze decking decisions that have been made by Expert Decking, TZ Decker or any of the N4 Automation Intra-block decking logic. The Decking History view reflects all decking work instructions that have been dispatched. Decking history information includes:

- Position selected by Decking
- Penalty score of selected position
- Time when decking decision was made
- Type of decking logic used
- N4 node that ran the thread for the decking decision
- Time it took to execute decking logic

From the Decking History view users can drill-down to see more details about a particular decking decision, including:

For Expert Decking:
- Expert Decking Parameter Set
- Expert Decking strategy
- Penalty calculation
- EC Parameters used for housekeeping moves

For N4 Decking:
- Code extensions used to run the decking logic
- Top two alternative slots
- Traffic regime and urgency

Rail Operations Support with Straddles and Empty Handlers (Phase 1)

N4 3.3 provides support for rail operations using wide span rail RMGs with transfer zones on both sides of the track plan and serviced by straddle carriers and empty handlers. An extensible background task splits moves for rail loads, rail discharges and assigns transfer points. Rail transfer points can be designated to accept specified rail move types and an extensible transfer zone decker finds the optimal TP considering rail car position, the move type, the current transfer zone inventory and the CHE type that will handle the move. In Phase 1, use cases for train load and discharge are implemented. In phase 2 uses cases for cross track transfer and other refinements from customer testing will be implemented.

Ability to create Rail Load/Discharge Work Instructions through N4 API

To support customers where the rail operators, and not the terminal, determine the load position of containers onto rail cars, N4 3.3 provides the ability to create Rail Load and Rail Discharge Work Instructions through API interface. The APIs can be accessed through code extensions and groovy plug-ins. The Work Instruction API places the newly created work instructions in either a default queue or a custom queue if the queue name is specified.

ENHANCED APPLICATION PERFORMANCE

Core Performance Improvements in XPS

The method XPS uses to find containers has been refactored to significantly decrease the time required to find a container to update or delete. This improvement will be most noticeable in sites where XPS has over 100K containers in the cache but will benefit all sites. This is just the first step in a bigger initiative to improve XPS performance and scalability.

In response to a security audit, the XPS Telnet port listener, aka the "debug port" is now disabled by default, closing a potential vulnerability in XPS. It can be enabled by XPS setting DBGPRT to "Y". Customers using the XPS debug port in their environments will need to change this setting after installing 3.3.

Message Processing Improvements

N4 3.3 provides a new 'Message Processing Groups' feature (similar to Job Groups) that allows for the systemic distribution of message processing across different nodes. By default, all nodes can process all types of messages but this configuration provides a capability to selectively remove busy nodes, avoiding them from becoming slow message consumers. That means the nodes that are usually busy with EDI, Scheduling, Dispatching and Reporting activities can be excluded from consuming JMS messages such as ECI, SNX, XPS inbound messages.

IMPROVEMENTS THAT MAKE IT EASIER TO ADMINISTER AND MAINTAIN N4

ECI Adapters View

N4 3.3 offers a new Equipment Control Interface (ECI) adapters view with basic properties of the configured ECI adapters and connection status. Actions menu or right-click on the ECI connection for a database adapter allows producing a 'DB HTML Dump' report about the contents of the shared database. This dump helps in analysis of ECI.

Reporting DB Indexes > 900 bytes

N4 3.3 provides a mechanism to view DB indexes that are over 900 bytes, which could cause critical exceptions in the operations. N4's App Indexes view for SQL Server has a new action called 'Find Indexes Over the Size Limit' which lists any indexes that are over 900 bytes. This is specific to SQL Server and this improvement makes it easy for the application to report these DB violations. The limitation of 900 bytes is not due to N4 application but from the MS-SQL Server DB.

Alternative Configuration for Center Node Failover

N4 3.3 provides the option to use a database table lock to control the Center node failover to the standby node in addition to file system lock. Glitches in the network likely to impact the file system locks by claiming both center nodes (active and stand-by) being active simultaneously causing unpredictable behavior. This improvement avoids such situation during network glitches.

Improved Logging

N4 3.3 logs additional information in the navis-apex.log on the Center node every 30 seconds. This will help in the analysis of issues reported.

- CPU usage (percent)
- Total memory and free memory (MB)
- QueueSizes: These values indicate the number of JMS messages in the n4.* and bridge.* queues.
- InflightCounts: These values indicate the number of JMS messages dispatched to the other nodes but not yet acknowledged.

For more detailed technical information on the N4 Release 3.3, please see the N4 3.3 Release Notes found on the NCC.

Navis provides operational technologies that unlock greater performance and efficiency for our customers, the world's leading terminal operators. The Navis N4 terminal operating system (TOS) represents more than 25 years of experience and innovation that enables terminals to optimize their operations and move cargo smarter, faster and more efficiently. As an industry leading technology, more than 250 container terminals worldwide have partnered with Navis to improve performance, reduce costs and minimize risk.