

IgnitionTM Applications Release Notes

ExxonMobil Chemical Company

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1. INTRODUCTION

This document contains release notes for incremental deliveries of a collection of Ignition-based applications created by ILS Automation for the Baton Rouge Chemicals Plant. The version of the document corresponds to the version of the application release.

2. VERSIONS

This section describes changes reflected the current release series for Ignition-based applications designed for the Baton Rouge Chemicals Plant. Details surrounding specific bug fixes may be found in the Trac database.

Please refer to the Installation Checklist in Section 7 of the Installation Manual for steps required for an upgrade. The sections below list steps that required in addition to these for particular updates.

2.1 Release 0.1r15

This release is based on Ignition 7.8.1.

2.1.1 Special Setup

Please update icons. There is a new icon for the BLT “timeFork” block. (This note was inadvertently omitted from the previous release notes.)

There is a new “Watermark” feature that allows a short message to be placed in the background of a diagram. During development of this feature, an error was discovered in the way that fonts are rendered on blocks in the Block Language Toolkit. New and newly imported blocks have been corrected, but some blocks that are serialized in existing diagrams will exhibit extremely large fonts. The remedy is to replace these blocks with new versions from the palette.

2.2 Release 0.1r14

This release is based on Ignition 7.8.1.

2.2.1 Special Setup

The SFC Browser functionality has been merged into the ILS-SFC module. Remove the *ils-sfc-browser* module from the Gateway.

A special SFC module is required; install SFC-Module.modl from the release package. The version is 2.8.1-beta1 (b2016012712) which can be verified on the Gateway Module Configuration page.

Database schema changes: There are a number of new tables for SFCs. Use createXOM.sql to create the full schema; SFC tables all being with “SFC”.

2.2.2 Features

- Common Framework
 - Updated the client tags used for setting the isolation mode. New implementation takes advantage of the settings made on the “External Interface Configuration” screen.
 - Updated the “Client Isolation Mode” to only have a check box for selecting Isolation or Production mode. The names of the database / Tag provider no longer need to be configured, rather they now come from the “External Interface Configuration” settings.
- UDTs
 - Updated the PKS ACE Controller
- SQC Plotting
 - SQC plotting prototype for initial feedback
- Database
 - Added new table for SQC Diagnosis

- Added / updated view LtValueView which is used for SQC plotting.
 - Added grade to lab data table LtHistory
- Diagnostic Toolkit – Block Language Toolkit
- Diagnostic Toolkit – Final Diagnosis & Calculations
- Diagnostic Toolkit – Migration
 - Converted all visible names of blocks, applications, families and more to strip trailing “-GDA”, embedded underscores and hyphens, and convert to title case.
- Lab Data
 - Fixed bug in configuration of lab data selector c9-lab-data-sqc for the flash drum configuration. The source of the selector was misconfigured to be: fd-c9-lab-data-ssqc. (note the double “s”)
 - Enhanced lab data handling to store the current grade with the lab value in the LtHistory table.
- IO
 - Implemented the PKS ACE controller methods and updated documentation accordingly.
- SFCs
 - Redesigned all Input blocks to use a Vision window rather than the modal system API.
 - Added built-in support for a timeout and registration with the control panel for Y/N step.
 - Redesigned window handling and control panel to support reconnecting to accidentally closed clients and windows.
 - In concert with IA SFC changes, refactored long-running block code to respond to pause and cancel.
 - Transitions are now “termination” transitions for long-running blocks, that is, the long-running block will complete as soon as a subsequent transition is true. Because there is always a subsequent transition (the system automatically adds a “true” transition), long-running blocks will need to have a subsequent transition checking “{previous.workDone}” to work properly.
 - Chart validator now checks for transitions following long-running blocks.
 - The sfc_demo project is no longer part of the release due to issues keeping it in sync with the XOM project. The XOM project should be used for testing SFCs.
- Custom Site Specific Functionality:
 - Initial attempt at Rate Change SFC.

2.2.3 Issues Addressed

- Startup issue where a tag change script was calling a BLT function before the BLT module was loaded. This was fixed by Ignition 7.8.1 rc1.

| <u>Ticket</u> | <u>Summary</u> | <u>Resolution</u> |
|-------------------------------|--|-----------------------------------|
| #357 | alphabetize recipe data value types | fixed |
| #356 | Fix Input recipe data value type to work like Output | fixed |
| #355 | Recipe data editor locks up | fixed |
| #353 | OUTPUT Recipe Data Value-Type is being Reset | fixed |
| #352 | Output Recipe Data Initial value-type | fixed |
| #347 | When changing state from app level, not all diagrams get the message | fixed |

| <u>Ticket</u> | <u>Summary</u> | <u>Resolution</u> |
|-----------------------------|---|--------------------------|
| <u>#346</u> | <u>SQCDiagnosis should support an embedded tag</u> | fixed |
| <u>#345</u> | <u>Difference block should handle date</u> | fixed |
| <u>#344</u> | <u>Problems Involving Diagram State</u> | fixed |
| <u>#343</u> | <u>Need mechanism to synchronize resources</u> | fixed |
| <u>#342</u> | <u>On diagram state change, empty tags don't stay empty</u> | fixed |
| <u>#341</u> | <u>On diagram state change, LabData emits two values</u> | worksperdesign |
| <u>#339</u> | <u>Cancel flag always set for charts run in Designer</u> | fixed |
| <u>#338</u> | <u>Get rid of modal dialogs</u> | fixed |
| <u>#335</u> | <u>Imported application should be disabled</u> | fixed |
| <u>#334</u> | <u>Scrub names during migration</u> | fixed |
| <u>#333</u> | <u>Delay Step - External Callback</u> | worksperdesign |
| <u>#332</u> | <u>Timer steps don't work when run in designer</u> | fixed |
| <u>#324</u> | <u>Prevent window close until no longer needed</u> | fixed |
| <u>#322</u> | <u>Need ability to recover client state including open windows</u> | fixed |
| <u>#321</u> | <u>Control Panel cancel does not work when waiting on UI response</u> | duplicate |
| <u>#303</u> | <u>Delete Notification enhancements</u> | fixed |
| <u>#298</u> | <u>Delete existing Control Panel when starting new chart</u> | fixed |
| <u>#219</u> | <u>Yes/No Block Timeout</u> | fixed |

2.3 Release 0.1r13

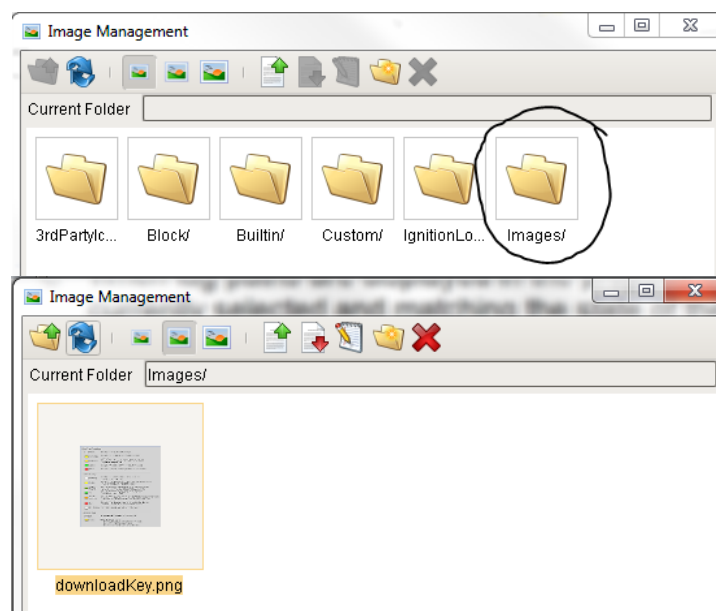
2.3.1 Special Setup

Icons must be re-installed in the Designer's Image Toolbox before a project with Diagnostic Toolkit resources is loaded.

2.3.2 Features

- UDTs – there is a new UDT export that includes the following changes:
 - A new UDT for the OPC Dataset Collector (see below). This UDT takes advantage of the new dataset tag type. There is a problem importing this – we are working on a workaround, but at this time the only thing we can do is change the type to a string, export then import, and change it back to a dataset. The two dataset tags are named: *Dataset Tags* and *Dataset Values*.
- Database
 - Modified DtFinalDiagnosis by adding two dynamic attributes: *LastRecommendationTime* and *TimeOfMostRecentRecommendationImplementation*, both dateTime data types that allows NULL values.
- Diagnostic Toolkit – Block Language Toolkit
 - As far as tag providers through the diagrams, the "External Interface Configuration" menu choice is master. Whatever it selects as provider name is used by anything bound to a tag. Tag subscriptions use the configured provider, not necessarily "XOM".
 - When tag paths are displayed in the property editor, they display the provider that is

- currently selected and matching the state of the diagram
 - The validator respects the tag provider selection and diagram state when validating paths.
- Diagnostic Toolkit – Final Diagnosis & Calculations
 - Added support for “CONSTANT” calculation methods. (and added automated tests)
 - Updated CSTR calculation methods per Norm’s feedback of enhanced logging.
 - Added a popup to display the full text for a diagnosis from the diagnosis queue.
 - Enhanced the text of a diagnosis posted to the diagnosis queue to include the quantitative details of the recommendation.
 - Modified *manage()* to set *LastRecommendationTime* when a recommendation is made. (*TimeOfMostRecentRecommendationImplementation* will be implemented when “Download” and “No Download” is implemented)
- Lab Data
 - Added support for isolation mode to the unit parameters. If the tag is an isolation tag then the isolation database will be used to implement the circular buffer.
 - Added a general purpose function for checking consistency between two tags. Consistency means that the lastChanged time of the second tag is \geq the lastChanged time of the first tag.
- IO
 - Redesigned and updated to support writing to the SP, OP, and Mode of a PKS controller.
 - Updated Design Specification
 - Standardized on WriteDatum and WriteWithNoCheck as the two primary APIs, regardless of the type of object you are writing to: simple memory or OPC tags, OPC Output and Conditional Output UDTs, and any controller UDT. WriteDatum confirms the write by reading back the value, WriteDatum checks that the write was successful but does not wait for a readback verification.
- SFCs
 - Supplied the icon for the PV Monitoring help screen. You must create a new *Images* folder and copy the supplied *downloadKey.png* file into it as shown below.



- OPC Dataset Collector
 - New functionality to create a dataset from SQL Tags, including OPC and/or direct reads from an OPC server. Includes windows that allows users to configure data collection including ability to only propagate data 'aligned' within a time window. A couple more features are required including ability to handle bad quality, for example use-last-value.
- C-Rx Structure Plot
 - Window that reads data from an OPC Dataset Collector UDT and creates the C-Rx structure plot. A couple more items are required; wire in automatic chart update script, proper bias, and message queue wire-in.

2.3.3 Issues Addressed

| <u>Ticket</u> | <u>Summary</u> | <u>Resolution</u> | <u>Priority</u> |
|-------------------------------|---|-----------------------------------|---------------------------------|
| #277 | Input Blocks Sleeping | fixed | major |
| #269 | LabData Input block last input wins | fixed | major |
| #251 | MovingAverageTime spouts errors | fixed | major |
| #232 | DiagToolkit Nav Tree icons | fixed | major |
| #222 | Sub-Diagnosis Block not reporting output | fixed | major |
| #278 | Validate Diagrams Issue | fixed | major |
| #247 | Command block should behave similar to Action | fixed | major |
| #245 | Data Conditioner should fire when quality is changed | fixed | major |
| #246 | CRX Mooney Gravity has missing connections | fixed | major |
| #275 | Write Output Step & Output Recipe data must handle string values | fixed | critical |
| #268 | Buttons for windows aren't showing up on Control Panel | worksforme | major |
| #267 | Timer Step Configuration | fixed | major |
| #266 | Add editor support for read-only recipe data fields | fixed | major |
| #265 | Open Control Panel before starting chart | fixed | major |
| #264 | Fix Collect Data to not require square brackets in tag path | fixed | major |
| #262 | timer start referenced for immediate write | fixed | major |
| #261 | write exceptions to wrapper log | fixed | major |
| #257 | Pause block doesn't | worksforme | major |
| #256 | Can't close windows | fixed | major |
| #255 | Message formatting in step attributes | fixed | major |
| #252 | Change Collect Data editor to use new architecture; add timeout_behavior property | fixed | major |
| #217 | ChartScopeCombo doesn't display current selection; gets NPE | fixed | major |
| #215 | make recipe data ordering in editor case-insensitive | fixed | major |
| #213 | add a TAG strategy for time delay step; use tag editor for TAGNAME property | fixed | major |
| #204 | add drop-downs for units, location, etc. in block config editors | fixed | major |
| #192 | improve substituteScopeReferences parsing | fixed | major |

2.4 Release 0.1r12

2.4.1 Special Setup

No special setup is required.

2.4.2 Features

2.4.3 Issues Addressed

| <u>Ticket</u> | <u>Summary</u> | <u>Resolution</u> |
|----------------------|--|-------------------|
| #286 | Exception running use case 6d first time | invalid |
| #285 | Set current message queue when debugging single chart | fixed |
| #284 | Manual Data Entry - Require All Inputs | fixed |
| #270 | Long running SFC blocks don't cancel | fixed |
| #250 | New block: PropertySetter | fixed |
| #248 | New block: TruthValuePulse | fixed |
| #221 | Enhance step property migration to warn when no translation is specified | fixed |

2.5 Release 0.1r11

2.5.1 Special Setup

The following extra-ordinary steps are required to configure the release installation:

This release requires Ignition 7.8. At time of writing, 7.8rc3 is available as an Early Access download. You will need to contact Inductive Automation to have your license updated for 7.8; until then it will run in Trial Mode. CAUTION!! There is a bug in rc2 (editTag) that breaks Lab Data. At time of writing, it is not known if this is fixed in rc3. If you plan to use Lab Data, do not install 7.8—and this release—until this bug is known to be fixed.

2.5.2 Features

Database:

- contains updates to the C-Rx Quant Output configurations.

Lab Data:

- Updated Poly Prop Lab Data source logic to correctly configure C-Rx or Flash drum source on startup.
- Animate tags on lab data chooser for multi-page configurations
- Fixed bug where the header of MLR-Raw-Lab-Data was wrong for a series grade
- Added a heartbeat on lab data configuration screens to keep the transaction id alive.
- Enhanced logic to wait for the HDA interface to become healthy on start-up before restoring history.

SFC:

- Write Output block supports writes to simple memory tags, OPC tags and the I/O UDTs described in Use case 6a
- Download GUI, Write Output, and PV Monitoring blocks operate per the Use Case 6b.
- PV Monitoring block passes use case 6d
- Added "Run Chart" to the "Tool" menu when the sfc-browser module is installed. This executes the current chart displayed on the screen adding to its startup environment scope and recipe data from its parent blocks.

- Added chart validation when the sfc-browser is installed.

UIR:

- Updated screens and database integration

Diagnostic Toolkit

- This release contains additional icons for the Diagnostic Toolkit, so these must be loaded in the Designer's image tool before loading diagrams
- Fixed several issues that caused input blocks to be unresponsive:
 - a) Case-sensitivity: There are numerous cases in the CRx application where the mapping for the migration included "CRx" in the path, whereas the tag import file had "CRX". Tests for existence with the case-mismatch succeeded, but the subscription code was case-sensitive and failed. This explains cases where you could do an "evaluate" on an input and see the value propagate (block simply reads the tag and sends value along), but the tag would never respond to a change (no subscription). This has been fixed. In addition, the validation will highlight any tags that do not have a subscription. If this occurs, the issue is almost certainly a programming error.
 - b) Source connections: The migration left the tag path properties as writers, not readers. So all the source connections are "dead". This is fixed. Note this will be a problem for CSTR as well. Source connections newly created from the palette were OK.
 - c) Newly imported diagrams. These didn't initially propagate values from the inputs. This has been solved this by setting the initial state on an import to "disabled". When the state is changed from Disabled to Active, all the tag subscriptions are established and the diagram becomes "live".
 - d) There was at least one migrated instance of a tag path pointing to a UDT instance rather than one of its sub-elements. The validation now reports this error.
- The validation table supports that ability to select a row and have the relevant diagram display.
- New blocks TruthValuePulse and PropertySetter appear on the palette, but these are not yet working.
- Added a new block TimeReadout that displays the time of the information being passed through it. Until now there was no easy way to display the time of a data value.
- Migration: Fixed an issue where some connections were lost in translation. This showed up especially in CRX.

2.5.3 Issues Addressed

| | |
|---|------------|
| #278 Validate Diagrams Issue | fixed |
| #277 Input Blocks Sleeping | fixed |
| Write Output Step & Output | |
| #275 Recipe data must handle string values | fixed |
| #269 LabData Input block last input wins | fixed |
| #268 Buttons for windows aren't showing up on Control Panel | worksforme |

| | |
|--|------------|
| #267 Timer Step Configuration | fixed |
| #266 Add editor support for read-only recipe data fields | fixed |
| #265 Open Control Panel before starting chart | fixed |
| #264 Fix Collect Data to not require square brackets in tag path | fixed |
| #262 timer start referenced for immediate write | fixed |
| #261 write exceptions to wrapper log | fixed |
| #257 Pause block doesn't | worksforme |
| #256 Can't close windows | fixed |
| #255 Message formatting in step attributes | fixed |
| #252 Change Collect Data editor to use new architecture; add timeout_behavior property | fixed |
| #251 MovingAverageTime spouts errors | fixed |
| #247 Command block should behave similar to Action | fixed |
| #246 CRX Mooney Gravity has missing connections | fixed |
| #245 Data Conditioner should fire when quality is changed | fixed |
| #232 DiagToolkit Nav Tree icons | fixed |
| #222 Sub-Diagnosis Block not reporting output | fixed |
| #217 ChartScopeCombo doesn't display current selection; gets NPE | fixed |
| #215 make recipe data ordering in editor case-insensitive | fixed |
| #213 add a TAG strategy for time delay step; use tag editor for TAGNAME property | fixed |
| #204 add drop-downs for units, location, etc. in block config editors | fixed |
| #192 improve substituteScopeReferences parsing | fixed |

2.6 Release 0.1r10**2.6.1 Special Setup:**

The following extra-ordinary steps are required to configure the release installation:

- This build requires that the XOM database instance be reconfigured/re-installed.
- Addition of a new LabData block requires that icons be re-installed.

2.6.2 Features:

Release 0.1r10 corrects a number of configuration issues uncovered during on-site testing of the Diagnostics Toolkit.

2.6.3 Issues Addressed

| <u>Ticket</u> | <u>Summary</u> | <u>Resolution</u> | <u>Created</u> |
|-------------------------------|--|-----------------------------------|--------------------------------|
| #240 | Quant Output Name Uniqueness | invalid | 09/09/15 |
| #237 | Wrong tag provider in FinalDiagnosis calculation | fixed | 09/09/15 |
| #236 | Exception calculating vectorclamps | fixed | 09/09/15 |
| #235 | Final Diagnosis Configuration Dialog needs UI improvements | fixed | 09/09/15 |
| #228 | Missing configuration tags | fixed | 09/09/15 |
| #224 | Connection post value not retained on import | worksforme | 09/09/15 |
| #223 | Plant status schematic issues with tag paths | fixed | 09/09/15 |
| #222 | Sub-Diagnosis Block not reporting output | fixed | 09/09/15 |

2.7 Release 0.1r9**2.7.1 Features:**

Release 0.1r9 is a minor update, clearing some migration issues in preparation for an on-site visit.

- Diagnostic Toolkit
 - Revised handling of diagnostic priorities so that 1 is higher than 10.
 - Compare block handles Date inputs
- SFC
 - See issues list
- Recipe Toolkit
 - Added logic to handle data returned from HDA where the last value is in the future and has a value of None
 - Modified the columns that are displayed by default to high the high and low limit and add Download Status
 - If writes are inhibited, the download status message indicates that writes are inhibited.
- Lab Data

- Implemented the Get History button to fetch the last 14 days of history and fill in any holes
- Added a timer to the download screen that is displayed when you press download.
- Added logic to reset the status of a family if the window is dismissed in the middle of a download. Also added logic to update the database when the download completes.
- Fixed bug where if recc and pend are NONE then the plan status was skipped which caused a record to be logged in the download log
- Modified the immediate downloads to pass or fail quickly and recognize when writes are inhibited
- Test framework
 - setBlockProperties() function now alerts both the block and property editor of change

2.7.2 Issues Addressed:

| <u>Ticket</u> | <u>Summary</u> | <u>Component</u> | <u>Resolution</u> | <u>Created</u> |
|---------------|---|----------------------------|-------------------|----------------|
| #214 | add ability to edit name for ILS step types | SFCs - Custom Blocks fixed | | 08/18/15 |

(Delivered 09/07/2015)

2.8 Release 0.1r8a

2.8.1 Features:

Release 0.1r8a corrects some build issues with 0.1r8.

- Additional tag locations have been coordinated between the tag creation file delivered in the release and migrated diagnostics toolkit applications.
- Missing Python scripts have been re-instated.
- In some situations the chart browser would enter an infinite loop. This has been addressed.

2.8.2 Known Issues:

- Two calculation methods used by the diagnostics toolkit are missing. These will be delivered shortly in a separate delivery.

(Delivered 09/01/2015)

2.9 Release 0.1r8

2.9.1 Special Setup:

The following extra-ordinary steps are required to configure the release installation:

- This build requires a privately supplied version of the Ignition SFC module. The module is supplied in the release.

2.9.2 Features

- CSTR calculation methods have been migrated and tested from the designer. There are 12 callbacks – 8 look good, 2 are missing, 2 have references that need to be resolved
- Configured all of the Quant Output tag references for CSTR

- Created all of the SFC I/O
- New SFC module from Colby fixed the ABORT block.
- Changed ASYNC writes to SYNC throughout lab data
- Fixed bug calculating the target value of SQC limits
- Fixed a bug in calculating derived values
- Made some progress in Drier Regen now that ABORT works
- Fixes to chart browser – was previously missing some connections resulting in too many connections showing up under the root.
- SFC find/replace now searches transition expressions.

2.9.3 Issues Addressed

| <u>Ticket</u> | <u>Summary</u> | <u>Component</u> | <u>Resolution</u> | <u>Created</u> |
|-------------------------------|--|----------------------------------|-----------------------------------|--------------------------------|
| #211 | chart animation draws multiple green (running) steps at once | SFCs - Custom Blocks | fixed | 08/18/15 |
| #209 | phase scope doesnt work in s88get | SFCs - Custom Blocks | fixed | 08/18/15 |

(Delivered 08/31/2015)

2.10 Release 0.1r7

2.10.1 Features

Diagnostic Toolkit:

Added Find/Replace capability

SFC:

Added Find/Replace Capability

Many issues addressed (see below)

Test Framework:

Added ability to offset the clock to a “test-time” during testing

Added ability to timestamp a signal broadcast during testing

Entry to a “QualifiedValue” block can come directly from a tag that is of type Date-time

There are several additions to the user interface that are “under construction”. These deal with:

- creation of a custom tag provider to allow time-stamping in the past
- section of an alternative (database) data source

2.10.2 Issues Addressed

| | | | |
|----------------------|--|-------------|-------|
| #206 | Test framework does not write to a date-time tag | defect | fixed |
| #205 | use one message handler for all SFC client handlers | enhancement | fixed |
| #203 | add a drop-down to select enclosed charts in Procedure, Operation, Phase | enhancement | fixed |
| #202 | remove "auditOn" etc from chart step java as it isnt connected | defect | fixed |
| #201 | write output should not expect a timer if all outputs are immediate mode | defect | fixed |
| #200 | Enclosed Cancel step must not proceed | defect | fixed |

| | | |
|--|-------------|-----------------|
| #195 Display inhibit block ExpirationTime as user readable timestamp | enhancement | fixed |
| #194 order recipe data in Designer alphabetically | enhancement | fixed |
| #193 restore "named" scope to s88Get | defect | fixed |
| #191 add curly-bracket recipe translation to Queue Insert step message | defect | fixed |
| #188 Recipe Data Disappers for Yes No Block | defect | fixed |
| #187 Basic Transition Performance with Previous / Prior recipe data | defect | fixed |
| #186 Yes / No Block should return "Yes" or "No" | defect | fixed |
| #184 Change recipe data type automatically | defect | fixed |
| #183 fix s88 set/get with units | defect | fixed |
| #181 refactor recipe data to use tags | enhancement | fixed |
| #180 Refactor IIsProperty to prevent copying bug | defect | fixed |
| #179 implement "animation" (state color) for custom SFC steps | enhancement | fixed |
| #178 create recipe data tags when chart starts | enhancement | fixed |
| #177 make recipe data expressions in transitions change-sensitive | enhancement | fixed |
| #176 change "previous" recipe data scope to "prior" | enhancement | fixed |
| #171 Implement "blockConfiguration" migration for WriteOutput step config | enhancement | fixed |
| #170 Implement Manual Data Entry SFC step | enhancement | fixed |
| #168 Project Wants To Update After Chart Completes | defect | fixed |
| #165 MovingAverageTime block management | enhancement | fixed |
| #164 MovingAverageTime uses the Average attribute to show last datum read into block | defect | fixed |
| #163 MovingAvdrageTime should report fully qualified values in history queue | enhancement | fixed |
| #123 reset diagram / block does not do anything to equality and to data inhibit blocks | question | workspersdesign |

2.11 Release 0.1r6

2.11.1 Special Setup:

The following extra-ordinary steps are required to configure the release installation:

- This build requires a specially built version of Ignition 7.7.5 rc2. This version has yet-to-be-published changes to the SFC processing as a result of Bootcamp VI agreements.
- The database schema has changed. Existing instances should be dropped and re-created. The create scripts now include site-specific configuration information. Thus there are now separate scripts for Vistalon and BRPO.

2.11.2 Features

Lab Data

1. Streamlined trace messages for PHD values
2. Added validation check for local data
3. Removed data from lab display table so that it does not flash when opened
4. Modified database table LtDerivedValue and created LtRelatedData

5. Modified migration script for derived values
6. Updated Lab Data Design Spec.
7. Modified LabData module to call derived callbacks in external or project scope.
8. Migrated (manually) the 4 derived value callbacks used in Vistalon
9. Completed the configuration screen for lab data display tables
10. Implemented animation to indicate that new data has arrived.
11. Added database table to record user that has seen data in support of #10
12. Modified table LtValue to support ValidationProcedure (schema & migration)
13. Revised unit parameter design (UDT, database tables, Python, and documentation). New design now supports just instantiating an instance in the designer without having to do anything to the database, i.e., a configuration screen is not needed. Python handles changes to buffer size dynamically.
14. Added table, TkAssociation, for defining associations between things. Also added a UI for configuring the table. Created a Python API: `ils.common.associations.fetchSinks()` to fetch everything connected to a named source.
15. Tested HDA interface with latest version of Ignition
16. Implemented Lab Data selector UI & database tables.
17. Created a UDT for the VFU Lab Baler Service objects.
18. Migrated (manually) the lab baler validation callback

Diagnostics Toolkit

- Minor fixes, including correction for a fatal Null-Pointer-Exception.

Sequential Function Charts

- This delivery represents significant progress in the handling of recipe data with the introduction of tag-based backing a permanent data-store. The tags are created automatically when data are accessed through the editor. The tags serve as a convenient way to browse (and change) the current state of a running chart.
 - 1) When recipe data are created in the Designer, a corresponding UDT instance is created as well
 - 2) Recipe data in existing chart definitions will not have a tag—to create it, do a dummy edit in the designer by opening the editor and accepting; that should create the tag
 - 3) A similar situation will apply to imported/migrated charts; follow step #2

Test Framework

- The supplied python libraries demonstrate enhanced access to block internals when testing the diagnostics toolkit.

Migration

- S88 charts are migrated for the first time. Migration is a combination of an initial automated pass at conversion from G2 exports (automated conversion failed on 3 of 23 charts). This is followed by manual updates to both chart structure and Python methods. The automated portion of the DrierRegen procedure is complete. The release includes a spreadsheet tracking the manual progress.

2.11.3 Issues Addressed

| Ticket | Summary | Resolution | Severity | Created |
|----------------------|--|------------|------------|----------|
| #162 | Reset Block | fixed | useability | 06/15/15 |
| #160 | Rename of Python block fails | fixed | system | 06/05/15 |

2.12 Release 0.1r5

2.12.1 Special Setup:

The following extra-ordinary steps are required to configure the release installation:

- This build requires Ignition 7.7.5 rc1 or higher.
- The database schema has changed. Existing instances should be dropped and re-created. The create scripts now include site-specific configuration information. Thus there are now separate scripts for Vistalon and BRPO.
- SFC-Module. A special SFC-Module, obtained from Inductive Automation, is required. (It has features newer than the latest IA published build and is contained in our distribution.) This is the same module contained in the last distribution.
- Tag create scripts are now provided for each site. Regenerate your tags using the script provided. Additionally the UDT definitions have changed.

2.12.2 Features

General

- Added CheckpointTimestamp to QueueMaster. Updated everything to do with message queues and added a save API which supports expanding a '*' to the current date.
- Revised database per latest revelations on Post -> Unit -> Application hierarchy.
- Added BRPO console.

Lab Data

- Added support to Lab Data Toolkit for Local Lab Data including:
 1. New database table
 2. New configuration tags for indicating communication down and for overriding manual entry permission
 3. Revised the Manual Lab value selector screen to use the above facilities.

UIR

- Integrated UIR into main project and hooked it into the UIR button on the two Vistalon consoles.

Diagnostics Toolkit

- The scripting interface has been expanded to include methods to list blocks related to a given block in a variety of ways. Full documentation is included in the [Block Language Toolkit Programmer's Manual](#).

Sequential Function Charts

- CollectData custom step is working.
- Tag selection editor fixed to incorporate UDT attributes.

Test Framework

- New assertion syntax has been added for dealing with entities that return lists.
- Any script argument can be an expression (variable or result of a script execution).

2.12.3 Issues Addressed

| Ticket | Summary | Resolution | Created |
|----------------------|--|------------|----------|
| #159 | DiagToolkit - ability to set diagram state is broken. | worksforme | 05/21/15 |
| #145 | DiagToolkit - require interface to query block connections | fixed | 05/01/15 |

2.13 Release 0.1r4**2.13.1 Special Setup:**

The following extra-ordinary steps are required to configure the release installation:

- This build requires Ignition 7.7.5 rc1 or higher.
- The contents of the distribution bundle have been re-arranged, placing site-specific configurations and documentation under the “Site” main directory.
- There is a new icon used for Inhibit block animation in the diag toolkit. Thus icons need to be re-loaded.
- The database schema has changed. Existing instances should be dropped and re-created. The create scripts now include site-specific configuration information. Thus there is now a separate script for each site.
- SFC-Module. A special SFC-Module, obtained from Inductive Automation, is required. (It has features newer than the latest IA published build and is contained in our distribution.) This is newer than the module contained in the last distribution.
- Tag create scripts are now provided for each site. Regenerate your tags using the script provided. Additionally the UDT definitions have changed.

2.13.2 Features**Lab Data**

- Lab Data issues that were discovered during last month’s trip to the facility have been resolved.

Diagnostics Toolkit

- A preliminary “high performance” revision of the block and connector routing algorithm is now in use. This version replaces the standard routine on diagrams that have over 12 connections. The route ignores blocks as “obstacles”. It works well on migrated diagrams, since the blocks had already been manually positioned in G2 in a “clean” layout. The routing works well for connections linked from left to right. Layout improvements for other orientations will be included in the next distribution.
- Test point blocks are now removed during migration.

Sequential Function Charts

- Null values are now allowed in recipe data.
- Separate primary and secondary configurations have been added to the Review Data step. They show up on separate tabs in the editor.

Test Framework

- Corrected an issue where Python scripts used to generate notification keys were not being invoked.

2.13.3 Issues Addressed

| Ticket | Summary | Resolution | Created |
|----------------------|--|-------------------|----------------|
| #155 | HighLimitCount block functionality is not quite correct | fixed | 05/07/15 |
| #154 | Simplify diagrams by removing blocks with no behavior | fixed | 05/07/15 |
| #153 | Get rid of testpoints | fixed | 05/07/15 |
| #152 | Migration mapping issue on data conditioner block | fixed | 05/07/15 |
| #150 | Internal data display should show QV on output ports | fixed | 05/07/15 |
| #149 | CSTR_ENB_PROBLEM - generated workspace is too small for migrated diagram | fixed | 05/07/15 |
| #148 | On Diagram reset, source blocks should re-read tag value and | fixed | 05/07/15 |

| Ticket | Summary | Resolution | Created |
|----------------------|---|-------------------|----------------|
| | propagate | | |
| #147 | Propagate UNKNOWN on a block reset | fixed | 05/07/15 |
| #146 | Delay Block Animation and Internal Data View | fixed | 05/04/15 |
| #144 | Source Connection Does Not Transmit Data | worksforme | 04/29/15 |
| #143 | Persistence Gate Not Counting | worksforme | 04/29/15 |
| #142 | DataConditioner block does not reevaluate with change to secondary input | worksperdesign | 04/28/15 |
| #141 | Java exception associated with block state | fixed | 04/28/15 |
| #140 | Readout block formatting "lost" after designer restart | fixed | 04/27/15 |
| #139 | Inhibit Block (aka Elapsed Timer Block) needs additional capabilities. | fixed | 04/26/15 |
| #138 | Need to suppress initial tag report on change to isolation mode | fixed | 04/24/15 |
| #137 | Readout blocks not showing UNKNOWN | fixed | 04/24/15 |
| #136 | HighLimitCountSample block reset/initialization problems | fixed | 04/24/15 |
| #135 | MovingAverageTime block functionality seems non-existent | fixed | 04/23/15 |
| #134 | Average block forced to evaluate by changing format of connected readout | fixed | 04/22/15 |
| #133 | HighSelector propagation of equal values | fixed | 04/22/15 |
| #132 | Readout block after block reset | fixed | 04/22/15 |
| #131 | Not-Block State and Port:Out Wierdness | fixed | 04/21/15 |
| #129 | LogicFilter Functionality | fixed | 04/20/15 |
| #128 | Changing TimeWindow of LogicFilter causes RESET of SQCBlock in Diagram | fixed | 04/20/15 |
| #126 | elapsed-time-variable (aka, data inhibit block) issues | fixed | 04/16/15 |
| #121 | Remove deprecated values - Diag Toolkit | fixed | 04/14/15 |
| #87 | Tag Picker for Input-Connection does not show new tag in Provider section | worksforme | 01/19/15 |
| #84 | Block must show correct status on outputs after gateway restart. | fixed | 01/16/15 |
| #74 | Highlimit/Lowlimit Observation block does not reflect diagram state on open | fixed | 12/10/14 |
| #17 | Connection routing is slow for complex diagrams | fixed | 10/24/14 |

2.14 Release 0.1r3

2.14.1 Special Setup:

The following extra-ordinary steps are required to configure the release installation:

- The database schema has changed. Existing instances should be dropped and re-created using the createXOM.sql script.
- The script mappings for external functions have changed. Once a new project has been loaded, execute the "configure" menu option on the root node of the Diagnostic Toolkit. Import from "extensions.csv" provided with the distribution. This is a persistent change and does not have to be repeated.

- SFC-Module. The special SFC-Module distributed as part of the last release is still required (but has not changed).
- UDT definitions have changed, regenerate your tags using the script provided.

2.14.2 Features

Lab Data

- This release marks the completion of the Lab Data component.

Recipe Data

- Project and scripting changes required to maintain compatibility with the new lab Data database schema changes.

Diagnostics Toolkit

- Database integration of “auxiliary data” is ready for test. These data are values associated with Application, Family and Final Diagnosis blocks that are database-resident and do not participate in the normal flow of block execution. Each of these block types have custom editors to modify this information. This feature is described in the new Section 3.5 of the [Block Language Toolkit Design](#) manual. NOTE: The automated delivery of migrated “auxiliary data” is not complete and is not a feature of this release. An initial update of the production database will be performed manually, on-site.
- All blocks now have a state that is reported as part of its internal status. For blocks that carry a logical result, the state is this result.

Sequential Function Charts

- A SFC step development “audit” has been completed—to bring code up-to-date with latest IA changes. See SFCStepScorecard.xls for a list of steps that are ready for review.
- The release now contains a ils_sfc_essentials_partial.proj project that contains all resources necessary to create a SFC-related project from scratch.
- There is now a scriptable interface for determining the last state of a chart step.
- The SFC_Demo project now contains the start of a regression test series.

Test Framework

- New syntax and python scripts designed for SFC testing.

2.14.3 Issues Addressed

| Ticket | Summary | Component | Resolution | Created |
|----------------------|--|-----------------------------|----------------|----------|
| #127 | SQC diagnosis does not report UNKNOWN on reset | Block Language Core | fixed | 04/16/15 |
| #125 | sqc block for n/n of type low concludes false with one datum in que when minimum requirement exceeds 1 | Block Language Core | worksperdesign | 04/16/15 |
| #124 | changing the test type for an sqc block causes history buffer to be purged | Block Language Core | worksforme | 04/16/15 |
| #122 | And-block and Or-block handling of UNKNOWN | Diagnostic Toolkit - Blocks | fixed | 04/14/15 |
| #120 | Interface to read block state is needed. | Block Language Core | fixed | 04/13/15 |
| #118 | Reset behavior regarding state and output connections | Block Language Core | fixed | 04/13/15 |

2.15 Release 0.1r2

2.15.1 Special Setup:

The following extra-ordinary steps are required to configure the release installation:

- **WARNING:** New FinalDiagnosis blocks carry a reference to a new custom property editor that will appear in the next release. For this attribute to show up, FinalDiagnosis blocks must be re-created from the palette.
- Ignition version 7.7.4-beta2 or newer.
- SFC-Module. We are back to requiring a pre-release version of the Ignition SFC module (different from the version we distributed last time. This is included as part of the release bundle and is required for SFC operation.
- UDT definitions have changed, regenerate your tags using the script provided.

2.15.2 Features

Diagnostics Toolkit

- All blocks now have a state that is reported as part of its internal status. For blocks that carry a logical result, the state is this result.
- Blocks that have multiple inputs retain the last-received input values on a reset().
- Blocks report an empty of UNKNOWN status on output ports following a reset.
- The “refresh” button on the internal status dialog works.

Test Framework

- Saves up to 10 versions of the log file.
- It is now possible to define and use python scripts directly in assertions and notification key definitions.

2.15.3 Issues Addressed

| Ticket | Summary | Component | Resolution | Created |
|----------------------|--|-----------------------------|----------------|----------|
| #119 | SQC "other-side" behavior is incorrect | Block Language Core | fixed | 04/13/15 |
| #117 | Sum (and other) block should retain input values during reset | Block Language Core | fixed | 04/13/15 |
| #116 | Diagnostic Diagram Updated on Save (e.g. following first creation) | Block Language Core | fixed | 04/09/15 |
| #115 | Data Conditioner Updating on Quality Change | Diagnostic Toolkit - Blocks | fixed | 04/09/15 |
| #114 | LogicFilter attribute mapping | Block Language Core | fixed | 04/01/15 |
| #113 | FinalDiagnosis missing attribute issues | Block Language Core | worksperdesign | 04/01/15 |
| #112 | FinalDiagnosis mapping issues | Block Language Core | fixed | 04/01/15 |
| #111 | Mapping to em-gda-elapsed-time-variable not found. | Block Language Core | fixed | 04/01/15 |
| #110 | SQC blocks are off-by-one | Block Language Core | fixed | 03/31/15 |
| #108 | SQC Test for m-out-of-n uses (m+1)-out-of-n | Block Language | fixed | 03/27/15 |

| Ticket | Summary | Component | Resolution | Created |
|---------------------|---|------------------------|------------|----------|
| | | Core | | |
| #75 | Logic Filter (still?) not correctly functioning | Block Language Core | fixed | 12/10/14 |

2.16 Release 0.1r1

2.16.1 Special Setup:

The following extra-ordinary steps are required to configure the release installation:

- Ignition version 7.7.4-beta2 or newer. NOTE: Unlike with previous releases, the SFC module to be used must be the one supplied by Inductive Automation as part of the release.
- Icons. Changes to a few icons require a re-install per instructions in the installation manual.
- There are minor changes to the database schema. Run the createXOM.sql script to re-generate your database.
- UDT definitions have changed, regenerate your tags using the script provided.
- Database/tag provider setup. Sections 4.1.9 and 4.1.10 describe application configurations that are new and must be performed.

2.16.2 Features

General

- A new selection appears under the Designer “View” menu whenever either BLT or ILS-SFC modules are installed. This sub-menu leads to a dialog for configuring database connections and tag providers for production and isolation modes.

Lab Data

- Prototype UDTs.
- Progress toward Lab Data viewer and database tables.

IO Controlllers

- UDT for controller classes has been updated (these definitions are part of the comprehensive UDT file contained in the release).

Diagnostics Toolkit

- A new configuration dialog is supplied for applications (in the Designer nav tree) that allows for assignment of Quant outputs to the application.
- Isolation mode. This new diagram state allows a diagram to be tested “in isolation” with no interaction with production databases or tags.
- Note that the new “power antenna” feature to add signal connections to blocks will only work on newly created blocks. The new menu selection will have no effect on blocks created under release 0.1r0 or earlier.

Sequential Control

- A series of Use Cases have been documented specifically for Sequential Control applications. The cases are accompanied by G2 exports so as to incorporate a full migration as part of each test.
- Use cases for Recipe Data Access, Time Delay, Foundation Steps, and Yes/No steps, plus chart status display and Control Panel action buttons work again.
- A demo project is supplied as a way of exxercising the use cases.

Migration

- 5 Vistalon diagnostic toolkit applications have been exported and migrated to Ignition diagrams, ready for debugging. The export includes creation of scripts for populating database tables.
- The 12 SFC use case exports have been exported and migrated, including translation of “on-start” callback procedures. About ½ of these currently execute.

2.16.3 Issues Addressed

| | | | | |
|----------------------|---|------------------------------|----------------|----------|
| #106 | Migration of post/debug must conform to logging standards | SFC Migration Utilities | fixed | 03/09/15 |
| #105 | Hiding the signal connection stub is not immediate | Block Language Core | fixed | 03/03/15 |
| #102 | Block Recipe Data De-select Missing? | SFCs - Custom Blocks | fixed | 03/02/15 |
| #101 | G2-Block-Evaluation maps to a Command | Diagnostic Toolkit Migration | fixed | 02/27/15 |
| #100 | Subdiagnosis -- output is a signal | Diagnostic Toolkit - Blocks | fixed | 02/27/15 |
| #99 | clock block needs a property defining what command triggers it. | Diagnostic Toolkit - Blocks | fixed | 02/27/15 |
| #98 | All blocks must respond to actions | Block Language Core | fixed | 02/27/15 |
| #97 | Latch block not designed correctly | Block Language Core | fixed | 02/26/15 |
| #96 | DataConditioner block incorrectly designed | Diagnostic Toolkit - Blocks | fixed | 02/26/15 |
| #94 | DiagToolkit - edit property causes a remove/reinstate of subscriptions on chart | Block Language Core | fixed | 02/25/15 |
| #93 | DiagToolkit - edit property causes a remove/reinstate of subscriptions on chart | Block Language Core | duplicate | 02/25/15 |
| #86 | Data-Conditioner should block bad values (functionality discrepancy) | Block Language Core | fixed | 01/19/15 |
| #85 | Input connections to other tag attributes other than value | Block Language Core | fixed | 01/19/15 |
| #80 | SQC Block Initialization and Counting Problems | Block Language Core | fixed | 01/06/15 |
| #60 | Arithmetic Block Error | Block Language Core | fixed | 11/05/14 |
| #1 | Extra box showing in property editor | Diagnostic Toolkit - Blocks | worksperdesign | 10/23/14 |

(Delivered 03/27/2015)

2.17 Release 0.1r0**2.17.1 System Requirements:**

This release requires Ignition 7.7.3-rc1 or newer. In addition, a special SFC module is supplied which must be installed in place of the module accompanying the Inductive Automation release.

2.17.2 Database Changes:

The following alterations are required. There are as of yet no alter scripts, but all changes have been incorporated into `createXOM.sql`. The database specification document and E/R diagrams have been updated accordingly.

- DtQuantOutput:
 - Moved IncrementalOutput up to reflect static type which must be manually configured and changed to be NOT NULL.
 - Add CurrentSetpoint and FinalSetpoint so that everything can be calculated in the manage script and all the UI does is display.
- Delete the DtConsoleSubscription table and added ConsoleId to the Application table. An Application goes to only one console.

2.17.3 Features**Diagnostics Toolkit**

- Bug Fixes as summarized below
- Preliminary screens for Application and Family configuration
- Extensions for database interfacing on application/family creation, editing.
- Setpoint spreadsheet is supplied in the XOM.proj. Features include:
 - incremental & absolute recommendations
 - manage() is modified to read current setpoint and calculate final setpoint and modified UI to just display what is in DB in the Final Setpoint column in the setpoint spreadsheet UI.
 - bound output check and vector clamping.
 - recommendation status for a diagnosis entry; implemented states are NONE-Made, Rec-Made, and Rescinded. Added tests 3a and 3b to test this.
 - import statement is dynamic so that the calculation methods can be in any external Python path.
 - Setpoint spreadsheet has enhanced notification to refresh a spreadsheet that is already open. (Previously we would open a spreadsheet on an interested client, but not push an update if the spreadsheet was already open)
 - UI modified to deactivate output rows when the application is made inactive
 - logic added to combine multiple recommendations to the same output using all of the strategies (sum, max, min, etc)

Interface Monitoring and Control

- Complete support for recipe data
- Support for lab data not started

Lab Data Toolkit

- Not started

Migration – Diagnostics Toolkit

- Preliminary G2-export for Vistalon

Ignition Applications Change Log
Migration – Sequential Function Charts

- First demonstration of a simple chart

ILS Automation, Inc.

One-of-a-Kind Applications

- Not started

Recipe Toolkit

- Complete

Sequential Control Toolkit

- Use Case 1 – Recipe data/scoping complete
- Use Case 2 – Importing/editing all classes of recipe
 - Majority of edit screens in place
- Block infrastructure updated per bootcamp
- Standard IA blocks usable, custom blocks need revisiting
- Unit conversion complete.

Misc

- Delivered first version of a comprehensive testing framework. Includes document, tag-driven testing, assertions for tag values and notifications, time acceleration. Python scripting interface.

2.17.4 Bug Fixes

- The following issues have been addressed in this release.

| Ticket | Summary | Component | Severity | Created |
|---------------------|---|---------------------|------------|----------|
| #62 | Action block configuration and use | Block Language Core | useability | 11/06/14 |
| #25 | Resize workspace "to fit" on opening | Block Language Core | useability | 10/24/14 |
| #15 | Resizing a diagram is limited by page size. | Block Language Core | useability | 10/24/14 |

(Delivered 02/23/2015)