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**Exor to AgileAssets Maintenance and PMS Interface**

**Scope and Requirements**

**October 2013**



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**Version Control**

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| November 2012 | Draft, 0.1 | RE | Initial Revision |
| September 2013 | 1.1 | RE | Addressing KY and AA comments |
| October 4, 2013 | 2.0 | DG | Accepted all revisions and comments - Issued |
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**Reference Documents**

Site Visit to KYTC v0.3.docx – Site Visit Report, Richard Ellis, June 2012

Exor to AgileAssets PMS interface.docx - Design of an interface between the Exor product and the AgileAssets PMS, 2007.

# Introduction

In May of 2012, Richard Ellis of Bentley Systems visited KYTC to review the current implementation of the Exor product, and to plan future improvements to it. During this visit it was identified that the creation of an Exor to AgileAssets data exchange interface offered a significant opportunity to improve the quality of information held in the AgileAssets system and reduce the effort currently expended keeping some aspects of the two systems coordinated. This will both improve the quality of road information held by the state and reduce the cost of duplicating data entry.

KYTC and Bentley Systems have established a project to undertake the scope and requirements analysis for this project. This report is the result of that analysis and it will be used to ensure everyone has a common understanding of the scope and requirements of this project. This report will then be used as the basis of a software design and of an acceptance test plan to ensure all requirements are met by the software that is produced.

# High Level Requirements

During initial discussion between Bentley Systems and KYTC it was determined that the main objective of this project was to create software that could replicate what KYTC currently does manually to update the Maintenance System Network information. This includes:

* Addition and removal of routes
* Updating route spatial representation
* Updating the location of ‘Event’ locations
* Send asset information to Agile from Exor

The implementation of this software will also prevent the addition of new maintenance events on roads that don’t yet exist while allowing the addition of events located on roads that have only been added recently. This interface should allow both the Maintenance and the PMS systems (currently both implemented using software from AgileAssets) to have their network locations maintained.

# Project Scope

Bentley Systems and KYTC have determined that the following items are in scope for the integration of Exor and the AgileAssets software:

* Exor should send to the AgileAssets System all network reference changes so that the AgileAssets system can replicate those changes.
* Exor should provide an initial version of the network information so that the AgileAssets system can take on an initial set of network information and/or refresh the network information it holds back to a common set.
* Network information includes a spatial representation of the network.
* A small amount of attribute information is maintained in Exor but required by the AgileAssets system, This should also be shared via the interface
* The link between Exor and AgileAssets is not ‘live’ but would be run approximately once a week, preferably on an automated schedule but with the ability to force the sync of the two systems on an ad hoc basis.

Bentley Systems and KYTC have determined that the following items are not in scope for the integration of Exor and the AgileAssets software:

* The AgileAssets system will not send any asset information to Exor via the Exor/AgileAssets integration software. Any information required by Exor will be provided via the corporate Data Warehouse project or as part of a later project.

# Functional Requirements

The interface will need to provide information from the Exor database in order to synchronize the network and asset information held in the AgileAssets system. The following functional requirements have been determined:

## Network Information

The Exor system must provide a current version of the network information so that the AgileAssets system can take a current set of network data. The AgileAssets system must also be made aware of all changes to the network.

The AgileAssets system also needs to be able to maintain the locations of existing objects. To do this the AgileAssets system will send to the Exor database a set of network locations and a date at which those locations were last updated. The interface software will integrate the network history information held within the Exor database and return a current set of network locations so that the AgileAssets system can update the location stored within the AgileAssets database.

When the network changes in any way, the spatial representation of the routes may also change. As part of the interface Exor will provide a spatial table of route shapes. These changes can include changes only in the spatial representation with no other change in attributes (such as the reshape of a datum). To facilitate this, the list of network changes must include changes only in the spatial representation.

A report is required so that staff can review what network changes have occurred and check that the appropriate changes have been applied.

## Asset Information

There are nine sets of asset information that must be communicated from Exor to the AgileAssets system. Details of the specific asset information is defined in Appendix 1 but the nine types are:

AL - Auxiliary Lane

FS – Functional Class

LN – Lanes

RA – Ratings

RW – Right-of-Way

SH – Shoulders

SL – Speed Limit

SS – State System

TF – Traffic information

Exor will make this asset information available to the AgileAssets system so it can both download an entire set of data and so that changes in this data can be tracked and maintained in the AgileAssets system.

# Technical Requirements

The interface will exchange data between two Oracle databases. The communication will be via a database link. The link will be forged from the AgileAssets system to the Exor system so that the AgileAssets system is able to read information from tables held in the Exor database.

The tables accessed by the AgileAssets system (via the database link) will be held in a separate schema. This will allow the AgileAssets connection to be isolated from the core Exor tables and allow the information required by the AgileAssets system to be partitioned separately.

Interaction between the two systems will happen periodically, probably weekly. This process should be able to be scheduled so that it can occur without the need for human intervention.

# Responsibilities

In order to successfully implement the interface between the AgileAssets system and Exor, three organizations will need to cooperate. The following table lists the responsibilities for various aspects of this project. This list is not exhaustive and other tasks may be required to reach a successful conclusion

|  |  |
| --- | --- |
| **Task** | **Responsibility** |
| Development and of scope and requirements | AgileAssets, Bentley Systems, KYTC |
| Documentation of scope and requirements | Bentley Systems |
| Sign off of scope and requirements | AgileAssets, Bentley Systems, KYTC |
| Design of Interface | AgileAssets, Bentley Systems, KYTC |
| Documentation of Design of Exor Components | Bentley Systems |
| Documentation of design for AgileAssets (if required) | AgileAssets |
| Sign off Interface design | KYTC |
| Develop testing approach and test cases | KYTC, AgileAssets, Bentley Systems |
| Develop Exor components | Bentley Systems |
| Develop AgileAssets components and modify configuration to accept Asset data coming from Exor | AgileAssets |
| Identify and correct LRS synchronization issues between AgileAssets and Exor systems | AgileAssets, Bentley Systems, KYTC |
| System Testing of the combined software | AgileAssets, Bentley Systems, KYTC |
| Acceptance testing of the combined software | KYTC, AgileAssets, Bentley Systems |

# Conclusion

This document is the result of a series of conversations between Bentley Systems, KYTC and AgileAssets with the objective of establishing an interface between the AgileAssets Maintenance System (including a PMS) and the Exor system KYTC uses to manage the road network and key asset data. During these discussions Bentley Systems and KYTC has established the scope of this project and the requirements that will need to be met in order for the project to be successful.

KYTC have confirmed that the project scope is restricted to communicating changes in Network and Asset information from Exor to the AgileAssets system. Information desired by the Exor system will flow back via the corporate information warehouse. The expected frequency of updates and other matters of scope have also been confirmed.

Bentley Systems and KYTC have recorded the requirements of the new software. The interface must exchange changes in network information, including the spatial representation of the network while also providing a full set of network data. In a similar way, the interface must exchange changes in nine asset types or there attributes.

Using the requirements recorded above Bentley Systems will create a software design document that details how the interface software will meet the requirements. To do this Bentley Systems will need to work with both KYTC and AgileAssets to design the Exor components of the solution. KYTC will then be given the opportunity to confirm this design before the software is built, tested and delivered.

# Appendix I

Asset information stored by Exor that must be exchanged with AgileAssets

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Asset Type** | **Attribute** | **EXOR Field** | **Agile Field Name** | **Notes** |
| AL | AUXLANE | IIT\_CHR\_ATTRIB26 | Not in system |  |
|  | AUXLNWID | IIT\_NUM\_ATTRIB16 | Not in system |  |
|  | AUXSURF | IIT\_CHR\_ATTRIB37 | Not in system |  |
|  |  |  |  |  |
| FS | URBAREA | IIT\_CHR\_ATTRIB39 | PMS.Custom\_5 | Not used currently, FUNCT is still reported as PMS.Cur\_Pave\_MGMT\_Sections.Class\_7 |
|  | STATUS | IIT\_CHR\_ATTRIB27 | PMS.Cur\_Pave\_MGMT\_Sections.In\_Use |  |
|  | FC | IIT\_CHR\_ATTRIB28 | PMS.Custom\_7 | Not used currently, FUNCT is still reported as PMS.Cur\_Pave\_MGMT\_Sections.Class\_7 |
|  | NHS | IIT\_CHR\_ATTRIB45 | PMS.Cur\_Pave\_MGMT\_Sections.Class\_5 | Class variables are defined in separate tables, shown on excel sheets below |
|  |  |  |  |  |
| LN | LANEWID | IIT\_NUM\_ATTRIB16 | PMS.Cur\_Pave\_MGMT\_Sections.Sec\_Width | Currently lists the result of # Lanes x Ln Width |
|  | LANES | IIT\_NUM\_ATTRIB17 | PMS.Cur\_Pave\_MGMT\_Sections.Number\_of\_Lanes |  |
|  | LANESCRD | IIT\_NUM\_ATTRIB18 | Not in system |  |
|  | LANESNC | IIT\_NUM\_ATTRIB19 | Not in system |  |
|  |  |  |  |  |
| RA | SAFEINDX | IIT\_NUM\_ATTRIB19 | Not in system |  |
|  | SERVINDX | IIT\_NUM\_ATTRIB20 | Not in system |  |
|  | COMPINDX | IIT\_NUM\_ATTRIB21 | Not in system |  |
|  | PERCENTILE | IIT\_NUM\_ATTRIB24 | Not in system |  |
|  |  |  |  |  |
| RW | ROW\_WIDTH | IIT\_NUM\_ATTRIB16 | Not in system |  |
|  |  |  |  |  |
| SH | SHLDTYPE | IIT\_CHR\_ATTRIB26 | Not in system |  |
|  | SHLDWID | IIT\_NUM\_ATTRIB16 | Not in system |  |
|  |  |  |  |  |
| SL | SPEEDLIM | IIT\_NUM\_ATTRIB16 | Not in system |  |
|  | OONUMBER | IIT\_NUM\_ATTRIB17 | Not in system |  |
|  |  |  |  |  |
| SS | STHWYSYS | IIT\_CHR\_ATTRIB38 | PMS.Cur\_Pave\_MGMT\_Sections.Class\_3 |  |
|  |  |  |  |  |
| TF | LASTCNT | IIT\_NUM\_ATTRIB25 | PMS.Traffic.ADT |  |
|  | LASTCNTYR | IIT\_NUM\_ATTRIB22 | Not in system |  |
|  | ADTSINGLE | IIT\_NUM\_ATTRIB80 | Not in system |  |
|  | ADTCOMBO | IIT\_NUM\_ATTRIB81 | PMS.Traffic.ESAL |  |
|  | PCSINGOP | IIT\_NUM\_ATTRIB17 | Not in system |  |
|  | PCCOMBOP | IIT\_NUM\_ATTRIB18 | Not in system |  |
|  | PCSINGPK | IIT\_NUM\_ATTRIB23 | Not in system |  |
|  | PCCOMBPK | IIT\_NUM\_ATTRIB77 | Not in system |  |