

**Illinois Statewide ITS Architecture
Maintenance Plan
Update
October 2019**

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
1. INTRODUCTION	1
2. INSTITUTIONAL FRAMEWORK SURROUNDING THE ILLINOIS STATEWIDE ITS ARCHITECTURE MAINTENANCE PROCESS	2
3. ILLINOIS STATEWIDE ITS ARCHITECTURE MAINTENANCE ROLES AND RESPONSIBILITIES	3
3.1 ADMINISTRATIVE MAINTENANCE	4
3.2 TECHNICAL MAINTENANCE	4
4. TIMETABLE FOR MAINTENANCE ACTIVITIES	9
5. ILLINOIS STATEWIDE ITS ARCHITECTURE BASELINE	3
6. CHANGE MANAGEMENT PROCESS FOR THE ILLINOIS STATEWIDE ITS ARCHITECTURE	9
6.1 IDENTIFYING CHANGES	9
6.2 EVALUATING CHANGES	10
6.3 APPROVING CHANGES	11
6.4 UPDATING BASELINE	12
6.5 NOTIFYING STAKEHOLDERS.....	13
7. SUMMARY	13

EXECUTIVE SUMMARY

This document presents the maintenance plan update for the Illinois Department of Transportation's (IDOT) Illinois Statewide ITS Architecture. The ITS Program office will also coordinate maintenance of Regional ITS Architectures in cooperation with Metropolitan Planning Organizations (MPOs) and Regional Planning Commissions (RPCs). Accordingly, this plan incorporates the process for maintenance of Regional ITS Architectures (RITSA).

The IDOT Statewide Intelligent Transportation System (ITS) Architecture covers statewide ITS functions while the Regional ITS Architectures (RITSA) cover region operations at the local level. Regions that have deployed significant intelligent transportation systems have their own unique regional ITS architectures that are consistent with the Statewide ITS architecture, and will address the maintenance of those regional ITS architectures at the regional level. The ITS Program office will lead regional coordination for RITSA maintenance to maintain consistency with Statewide Architecture.

The Illinois Statewide and Regional ITS Architectures should be continuously maintained to assure:

- Consistency with state plans and priorities,
- New projects properly integrate with existing systems,
- New projects do not duplicate current systems,
- Stakeholders are current and properly represented,
- The State is prioritizing and utilizing resources efficiently, and
- New projects are eligible for Federal funding.

In addition to on-going maintenance, the architecture should undergo a comprehensive update every three years to confirm status of implementation and to ensure that all ITS initiatives in the state are consistent with the Statewide ITS Architecture.

Two components of the ITS Architecture requires maintenance: the Architecture Database and the associated Architecture Document. Of the two components, maintaining the Database is the most important, as it is the foundation of the architecture. The Architecture Document derives tables of functions from the Architecture Database and describes how the architecture is used to develop new projects. This document provides guidance for the database maintenance process including roles and responsibilities.

1. INTRODUCTION

The Illinois Statewide ITS Architecture provides a common framework for planning, defining, integrating and deploying intelligent transportation systems. The architecture defines:

- The functions that are required to support an Intelligent Transportation System service (e.g. incident information, traveler information),
- The physical entities or subsystems where these functions reside, and
- The information flows and data flows that connect these functions and subsystems together into an integrated system.

As ITS projects are implemented, the Statewide ITS Architecture will need to be updated to reflect status, new ITS priorities and strategies that emerge through the transportation planning process to account for expansion in ITS scope, and to allow for the evolution and incorporation of new ideas and stakeholders. The Statewide ITS Architecture has a ten-year time horizon as does the majority of regional ITS architectures that support the higher-level statewide architecture.

A maintenance process has been defined for the Illinois Statewide ITS Architecture. This process includes an update to the Statewide ITS Architecture every three years, defined Configuration Management techniques to maintain the architecture, a specific group – the IDOT ITS Program Office (ITSPO) – responsible for maintaining the Statewide ITS Architecture, and an institutional framework for regional and statewide stakeholders to continue to provide guidance to the evolution of the architecture.

The purpose of maintaining an ITS architecture is to keep it current and relevant so that stakeholders will use it as a technical and institutional reference when developing specific ITS project plans.

While the Statewide ITS Architecture denotes Statewide/cross-regional functions, Regional Architectures include more rural and smaller municipality functions, and focus on unique local functions that are more specific at the local level. A regional ITS architecture supports the objectives and specific needs of transportation agencies in a specific region. It provides a plan for how data is collected, archived, and processed to support transportation planning, safe and efficient operations, as well as performance monitoring. It is envisioned that the final regional ITS Architectures would play an important role in the state, providing the framework for agencies to cooperatively select and prioritize ITS investments.

The goal of the Architecture Maintenance Plan is to provide the methodology for updating the Statewide ITS Architecture so that it continues to accurately reflect the State's existing ITS capabilities and future plans. The ITS Program office will also coordinate maintenance of Regional ITS Architectures in cooperation with MPOs.

2. INSTITUTIONAL FRAMEWORK

From an institutional perspective, statewide coordination of ITS stakeholders and decision makers is important to the Architecture maintenance process. The current project structure utilizes a Steering Committee (SC) to provide overall project direction and policy-level guidance, and a Technical Committee (TC) with representatives from each IDOT District, MPOs, and key local and regional agencies. This project oversight structure can also be used to manage the Architecture Maintenance Process.

The TC function becomes the Architecture Change Management Board and the current SC becomes the Policy Oversight Board. Each group has particular functions and duties in maintaining the architecture. Table 1 outlines the roles and responsibilities of each group within the institutional framework for maintaining the Statewide ITS Architecture.

With the baseline understanding that individual agencies control the systems that they own and operate, the proposed Roles and Responsibilities of each group in maintaining the ITS Architectures are summarized below:

- IDOT's ITS Program Office (ITSP0) is responsible for updating and maintaining the statewide architecture. Change requests are submitted by a stakeholder to the IDOT ITS Program Office. If the change is IDOT specific and affects no other stakeholders, the Program Office can implement the change.
- MPOs/RPCs are responsible for updating and maintaining the regional architectures. Change requests are submitted by project owners to the relevant MPO/RPC. If the change is consistent with the existing architecture, the MPO/RPC may implement the change. If a requested change is inconsistent and requires review, modification and approval, the designated Technical Committee should be convened.
- Partner Agencies, IDOT MPO Liaisons, and the FHWA have key supporting roles in the architecture maintenance process, ensuring coordination across state and federal programs and requirements.

During stakeholder outreach for the Architecture update, there was an emphasis on aligning the ITS project concept initiation and development with existing TIP and/or LRTP processes. In order for federal funds to be used for ITS project implementation, such projects must be included in the Transportation Improvement Plan (TIP), which is approved by the MPO or State. Requirements of the TIP process are complimentary with the ITS Planning for Operations. The TIP must include project detail and specificity, and projects should be ready for implementation once placed in the TIP. An agency or sponsor of a project must be identified to take responsibility for implementation and identification of funding.

The original Architecture plan was not actively utilized as intended. The Policy Oversight Committee and Change Board were not convened and architecture maintenance did not occur.

In order to maintain the current architecture update, steps for identifying and evaluating changes remain valid. The Change Request Form is also valid for tracking updates.

It is recommended that the ITS Program Office incorporate ITS Architecture Maintenance activities and discussions into the various IDOT program meetings held with internal statewide district and regional staff for purposes of training, peer exchange and program development. These meetings occur over the course of the year and are typically held in various locations, affording ample opportunity for project planners and implementers to address the ITS Program.

This update recommends incorporation of the architecture review and approval process into the regional planning, project selection and prioritization process for each region. IDOT program management should implement and maintain the Statewide ITS Architecture. Stakeholders are at the table as part of federally mandated transportation demand, strategies and TSMO references. For the MPOs, the key to successfully maintain the architecture is to incorporate this process into the existing Technical or Operations Committee or Task Force included in the MPO/RPC structure.

As a result of RITSA technical assistance provided by the project team for architecture updates and development, there is a strong group of champions in each region to continue to participate in the architecture maintenance process. The Champions are familiar with the RAD-IT tools and agree to work with the IDOT ITSPO on sharing and maintaining current versions of the RITSA database files.

3. ITS ARCHITECTURE UPDATE

Updating the Architecture requires clear identification of the baseline and updated products that will be maintained, including specific format and version information. The ITS Architecture updates consist of the following outputs:

1. Statewide ITS Architecture Update Document
2. Statewide and Regional Architecture Databases

For updates to the Statewide Architecture document, the source document, in Microsoft Word format, is held by the IDOT ITSPO, while a PDF version of the document is made available for general distribution. A version number along with the release date is included inside the cover page of the Document Revision History Table.

For the Statewide Architecture databases, it is recommended that the source files be maintained by the IDOT ITSPO and a zipped version of the final delivered Statewide ITS Architecture database be available upon request. The name, date, and size of the each database file inside the zipped file should be entered into an architecture change log with the current version number of the updated architecture.

4. ROLES AND RESPONSIBILITIES

There are two types of maintenance that can be made to the ITS Architectures: Administrative and Technical. The distinction is that Administrative maintenance does not require the approval of a Technical Committee, Change Management Board, Policy Oversight Board or other designated group, while Technical changes may require discussion and approval depending on the impact and scope of the proposed change.

4.1 Administrative Maintenance

Administrative maintenance tasks involve amending the interfaces and information flows, correcting/modifying inventory descriptions, and adding/modifying/deleting stakeholders, for example.

The IDOT ITSP0 and/or MPO/RPC, as appropriate, will evaluate each proposed ITS project and related architecture change requests to determine consistency with the Regional ITS Architectures (RITSA), and if appropriate, for inclusion at the Statewide level.

A project is considered “consistent” with the Statewide ITS Architecture if the elements of the project and their associated functionality are contained in the current architecture. The proposing agency will work with the IDOT ITSP0 staff to document the communications and data exchanges between agencies introduced or modified through the proposed project. If the project under consideration is consistent, and the communications flows are determined to be “existing,” then no action is required to update the current architecture baseline. If the project under consideration is consistent, and the communication and data flows are documented as “planned,” then IDOT ITSP0 staff prepares the top portion of the Change Request Form shown in Figure 2 to prepare for the change in status of those existing communication interfaces.

There was a consensus that this approach will help integrate the architecture process in the typical update schedule that the regions follow. A workflow for the RITSA Development and Update process was determined in coordination with the regional champions. During the discussions held, MPO/RPC Champions indicated intent to maintain the architectures databases themselves OR work with the project owners to provide updates to be reviewed by the MPO. Either method is viable for RITSA maintenance. The latter approach gives the project owners better ability to consider RAD-IT features and engage their regional partners in project opportunities. This regional architecture approach, shown in Figure 4 requires that the MPO/RPC or other champion will also maintain version controls on the RAD-IT file and related architecture change documentation.

4.2 Technical Maintenance

Technical maintenance tasks involve more significant architecture changes that may include identification of new service packages, stakeholders, and initiatives that impact key functionality.

The proposing agency/project owner will work with the MPO/RPC staff to determine if an ITS Project warrants amendment of the RITSA. If the project is statewide in scope, or well beyond

the MPO boundaries, this will include review and approval by the ITSPO. The proposing agency in cooperation with the MPO/RPC will provide documentation of the recommended change(s) utilizing the Change Request Form shown in Figure 2. The project owner will submit the Change Request Form to the MPO for all regional cases. The MPO will share those changes with the IDOT ITSPO for confirmation of conformance with the statewide architecture. For RITSAs, a MPO technical committee, or other designated group serves as the Change Board. At the statewide level, the ITSPO may designate an internal Change Board, to include representatives from the ITSPO, IDOT Planning and Programming, and Traffic Operations, at a minimum.

In the instance where any proposed ITS project is determined to be inconsistent with the Statewide ITS Architecture, the MPO/RPC and project sponsor will coordinate with the IDOT ITSPO staff to propose an amendment. The stakeholder proposing the amendment will provide documentation regarding participating stakeholders and/or agencies and related agreements that support the architecture modifications. Table 1 outlines the various roles and responsibilities for regional and statewide stakeholders in conducting ITS Architecture compliance activities.

Approved Changes to RAD-IT databases can be accomplished in two ways, depending on the level of engagement of the project owners:

1. The ITSPO or MPO/RPC champion will input the information provided by the project owner in the approved Change Request Form and corresponding information into the current RAD-IT file. A meeting will be held with affected stakeholders to document and confirm the functionality and interfaces, before finalizing the file.
2. The MPO/RPC champion or ITSPO maintainer will release the current RAD-IT file to the project owner to input the information from the approved Change Request Form and corresponding information. After the project owner enters the approved updates to RAD-IT, the maintainer will review and accept the updated version of RAD-IT as the current architecture, updating the version number to maintain version control.

**Table 1
ITS Architecture Roles & Responsibilities**

	STAKEHOLDERS					
	IDOT MPO Liaisons	IDOT ITS Program office	IDOT District Engineer, ITS Coordinator / Project Owner/ Sponsor	Local Champion MPO/ RPC	Transportation Agency / Local Partner implementing ITS project	FHWA
ACTIVITY						
Participate in ITS Architecture Development	S	P	P	P	S	S
Develop RITSA Database RAD-IT	S	S	S	P	S	S
Maintain RITSA RAD-IT Database	S	S	S	P	S	S
Develop Statewide ITS Architecture RAD-IT Database	S	P	S	S	S	S
Maintain Statewide ITS Architecture RAD-IT Database	S	P	S	S	S	S
Submit Architecture Changes for Approval	S	P	P	P	P/S	S
Review/Approve/Reject RAD-IT changes	S	P	S	P	S	S
Implement ITS Projects in RITSA / Statewide	S	P	P	S	P	S

(S) Support (P) Primary

Figure 1: Illinois Statewide ITS Architecture Change Request Hierarchy

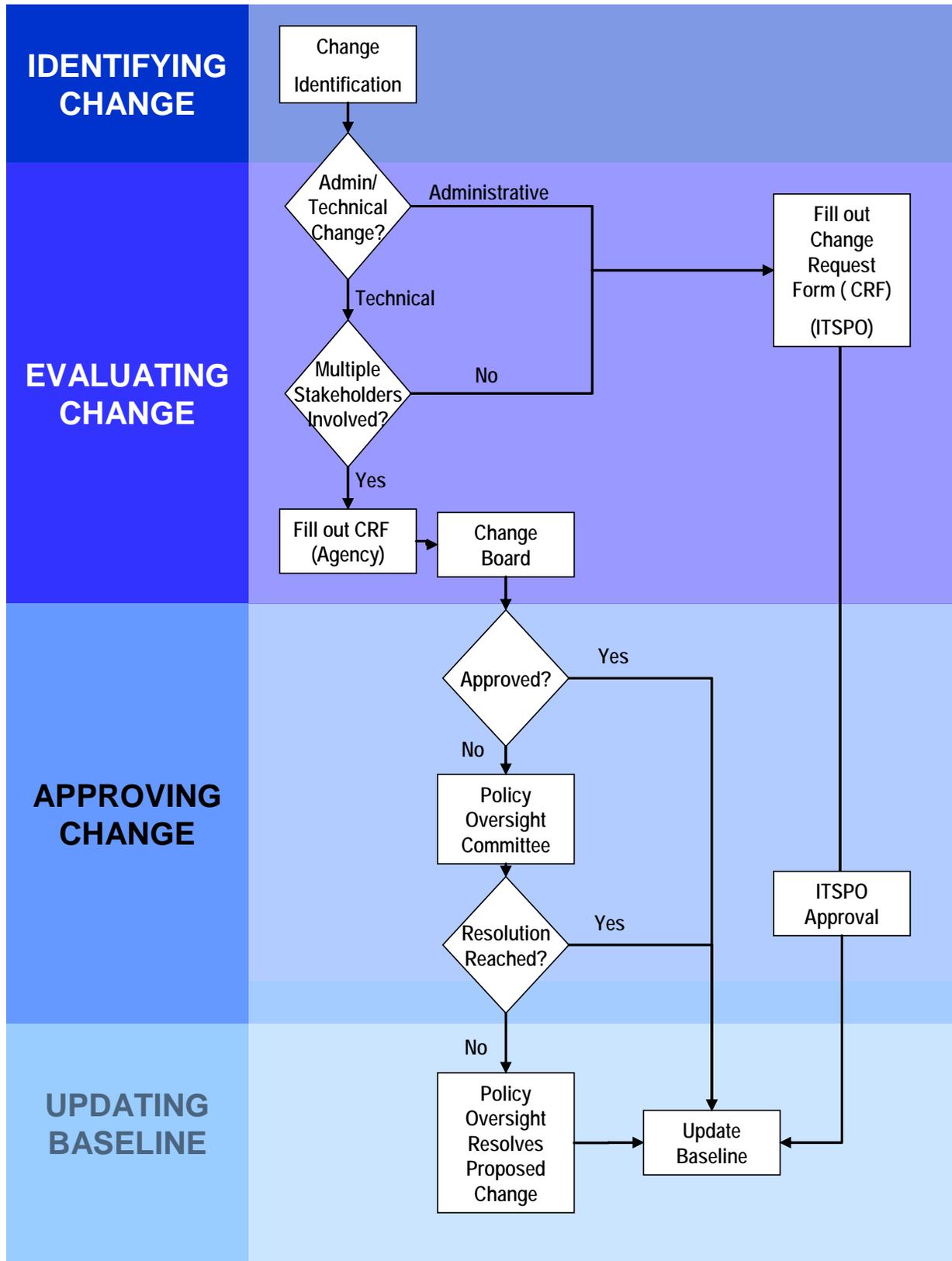


Figure 2: Illinois Statewide ITS Architecture Change Request Form (CRF)

Change Identification:		Request Date:	
Change Description:			
Rationale for Change:			
Request Originator Contact Information:	Name:		
	Agency:		
	Address:		
	Telephone:		
	Fax:		
	Email:		
<i>To be filled out by Architecture Maintainer</i>			
Change Number*:			
Change Decision:	Accept	Reject	Defer
Decision Comments:			
Decision Date:			
Architecture Components Affected:			
Change Type:	Administrative: Minor	Administrative: Major	
	Programmatic: Minor	Programmatic: Major	

* XX-YY, where XX = year and YY = chronological value, e.g., the first change request of 2010 would be '19-01'

5. TIMETABLE FOR MAINTENANCE ACTIVITIES

A comprehensive architecture update is recommended every three years, concurrent with the update of the Statewide ITS Strategic Plan. This comprehensive update would include involving new stakeholders, reviewing services planned for the area, and other technology initiatives, as appropriate. It is recommended that a major review and update of the architecture be performed in the six (6) months prior to the regional transportation plan updates throughout the state.

Minor revisions and administrative updates, such as changes in the status of an individual architecture flow between stakeholders, can be made as the information is received, or on an annual basis. Minor changes can be incorporated by members of the IDOT ITSPO and MPO/RPC staff as needed and as facilitated by agency decision making structure. All revisions or changes will be documented to ensure the integrity of the Statewide ITS Architecture for Illinois.

6. CHANGE MANAGEMENT PROCESS

The change management process specifies how changes are identified, how often they will be made, and how the changes will be reviewed, implemented, and released. This process remains valid.

6.1 Identifying Changes

The Illinois Statewide and Regional ITS Architectures were updated and created in some instances, in consultation with stakeholders in each IDOT District. Updates include current transportation needs, relevant service packages and projects that are existing, planned or a future consideration. As ITS projects are implemented and institutional arrangements change, there are many actions that may trigger a need to consider an update to the architecture.

1. Changes for Project Definition. An ITS project may be modified to add, subtract or modify elements, interfaces, or information flows. Such changes should be included periodically to accurately reflect the status of deployed projects.
2. Changes in Stakeholders. There are several “generic” stakeholder groups in the Illinois Statewide ITS Architecture that list the agencies included in the group. For example, small municipal transit agencies such as Danville, are identified under one regional ITS element identified as "Small Municipal Transit Agencies."

As stakeholders are identified, their description will be added, as appropriate, to the Statewide ITS Architecture. Entirely new stakeholder entities proposed for the Statewide Architecture may also be considered by the regional developers for inclusion into their respective regional ITS architectures.

A tool to help in identifying stakeholder changes is the “Unconnected Stakeholders” Report located under the Tools Menu in Architecture. This report, when requested, will

automatically identify in Statewide ITS Architecture any isolated stakeholders that are currently not be addressed by any elements or interfaces.

3. Changes for Project Addition/Deletion. Occasionally a project will be added, deleted or modified during the planning process. When this occurs, the aspects of the regional ITS architecture associated with the project have to be added, deleted or modified as appropriate to the Statewide ITS Architecture. A set of tools to help in identifying these changes are the “Unsupported Flows” and “Unconnected Elements” Reports located under the Tools Menu in Architecture. These reports, when requested, will automatically identify in Statewide ITS Architecture any isolated elements that may be candidates for addition or deletion.
4. Changes in Project Status. As projects deploy, the status of the architecture elements, services and flows that are part of the project should be changed from planned to existing. Elements, services, and flows exist when they are substantially complete in that they have been turned on, tested, and are currently being used.
5. Changes in Statewide ITS Strategic Plan. For many reasons (e.g., funding constraints, technological changes, other considerations), a planned statewide project may end up being delayed or accelerated. Priority for individual projects can also change. Such changes must be reflected in the Illinois Statewide ITS Architecture and may also merit changes to the affected regional architectures.
6. Changes in Statewide Needs. Over time, the needs across the state may evolve or change and the corresponding aspects of the Statewide ITS Architecture may require updates for planned regional services. While the Statewide ITS Architecture was developed with input from a diverse representation of stakeholders throughout the state, not all stakeholders were able to actively participate. Over time, transportation needs can be impacted as new stakeholders, technological advancements, and transportation challenges emerge.
7. Changes to reflect National ITS Architecture Revisions. The National ITS Architecture tool for development of ITS architectures across the country, changed from Turbo to RAD-IT and updated versions are released periodically that may include new user services. The recent update incorporated services for enabling the connected vehicle environment. Such changes should also be considered as the Statewide ITS Architecture is updated.

6.2 Evaluating Changes

To obtain federal funding, ITS implementers will be required to self-certify that their projects are consistent with the Statewide ITS Architecture (and their regional architecture) or will request changes in the architecture to maintain consistency. Stakeholders proposing a change to the baseline statewide architecture, due to new or changing initiatives should inform the IDOT ITSPo staff of the status of any projects where changes appear to be significant. To properly maintain the architecture, IDOT ITSPo staff should be informed not only of when projects are

planned; but also when projects are completed or when changes made during design or construction impact the Statewide Architecture.

Stakeholders implementing projects that may change the statewide architecture should propose changes to the IDOT ITSP0 using the Change Request Form (Figure 2). If the project is regional in nature, the changes will primary only impact the regional architecture, but new service packages and types of stakeholders will warrant IDOT ITSP0 review relative to the statewide architecture. All proposed changes should clearly describe the architecture elements to be added, deleted or revised and/or be checked via the RAD-IT change control logs.

Each requested change will be reviewed by the IDOT ITSP0 staff to determine if the request warrants a change in the Statewide ITS Architecture. If the proposed architecture modification has an impact on other stakeholders, the IDOT ITSP0 staff will contact the stakeholders to confirm their agreement with the modification. If the issue warrants a major programmatic change, a stakeholder meeting to discuss the modification may be held. When a decision is reached on a specific Change Request, the bottom portion of the Change Request Form shown in Figure 2 should record the results. It is envisioned that the regional champions, the owning agencies, and the IDOT ITSP0 will cooperatively review projects, and consider opportunities to enhance projects in terms of fulfilling operational goals related to the architectures.

6.3 Approving Changes

Approvals are granted in accordance with the institutional decision process described in Section 4. If a Change Request is rejected, the originator will be informed of the decision and the reason(s) for the decision. The proposer/requester may be invited to resubmit a revised Change Request for reconsideration to address any issues identified.

All requested changes will be documented in the Statewide ITS Architecture Change Database. Below is a sample Change Database entry highlighting the information that would be taken from the Change Request forms and entered into the Change Database. The IDOT ITSP0 maintains the Change Database for the Statewide ITS Architecture as shown in Table 2 below. MPO/RPCs maintain the change database for Regional Architecture.

Table 2 - Change Database Log

Change Number	Change Description	Request Originator	Change Decision	Decision Date	Decision Comment	Architecture Components Affected	Change Type
XX-YY*	Expanded description of the requested change	Name of request originator	Accept, reject, or defer	Date decision is made	Pertinent details associated with change decision	Listing of affected architecture components	Minor or major

* XX = year and YY = chronological value

Finally, any changes made to the architecture should be documented within RAD-IT using the built-in change log feature. The maintainer can control the version number of RAD-IT and document associated changes with the feature shown below in Figure 3 ITS Architecture Maintenance Record.

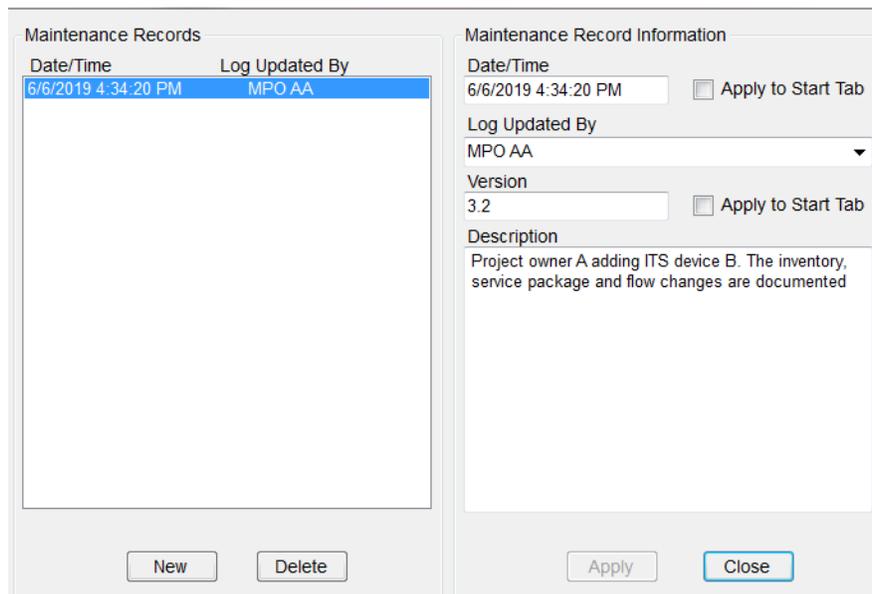


Figure 3 - ITS Architecture Maintenance Record

6.4 Updating Baseline Architectures

As of 2018, the National ITS Architecture has undergone significant improvements. The newest release, *Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) Version 8.2*, features a user-friendly web interface. It is designed to be easily accessible for all different types of users, providing a wealth of help, explanations and hyperlinks for all use cases.

ARC-IT refers to the architecture itself, which is fully accessible online. Note that ARC-IT is not a software tool or a direct replacement for Turbo Architecture. Additionally, note that what were previously called market packages are now called **Service Packages**. The titles of the previous set were renamed to be more practical, and the set of packages now includes connected vehicle capabilities. All Service Packages are detailed online, as part of the ARC-IT interface. Beyond the web functionality, the tools for creating and maintaining ITS architectures were also overhauled. Turbo Architecture is no longer supported, and it has been replaced by two new software tools:

RAD-IT: The Regional Architecture Development tool can be considered a direct replacement for Turbo Architecture. “RAD-IT is a software application that supports the development of regional and project ITS architectures using ARC-IT as a starting point.”

SET-IT: The Systems Engineering tool “provides a single software tool that integrates drawing and database tools with the ARC-IT so that users can develop project architectures for pilots, test beds and early deployments.”

Once the architecture maintenance is complete, the IDOT ITSPO or MPO/RPC will submit both the updated architecture document and updated Architecture file to the Change Management

Board and the Policy & Oversight Board (or designated group) for approval. The updated architecture will then undergo the same review and approval process as described above for individual architecture change requests.

6.5 Notifying Stakeholders

Once the regional architecture has been updated, the regional stakeholders will be notified and informed on how to obtain the latest version. The IDOT ITSPO or MPO/RPC will maintain a list of stakeholders and their contact information for coordination and dissemination.

7. SUMMARY

Maintaining the Illinois Statewide ITS Architecture as described in this document will facilitate compliance with federal requirements for ITS funding, supports on-going transportation planning and budgeting activities, and provides a mechanism for assuring proper integration between projects. Additional benefits of the process can be realized when applied in conjunction with ongoing transportation systems management and operations activities.

REGIONAL ARCHITECTURE MAINTENANCE PROCESS - PROJECT OWNER UPDATES

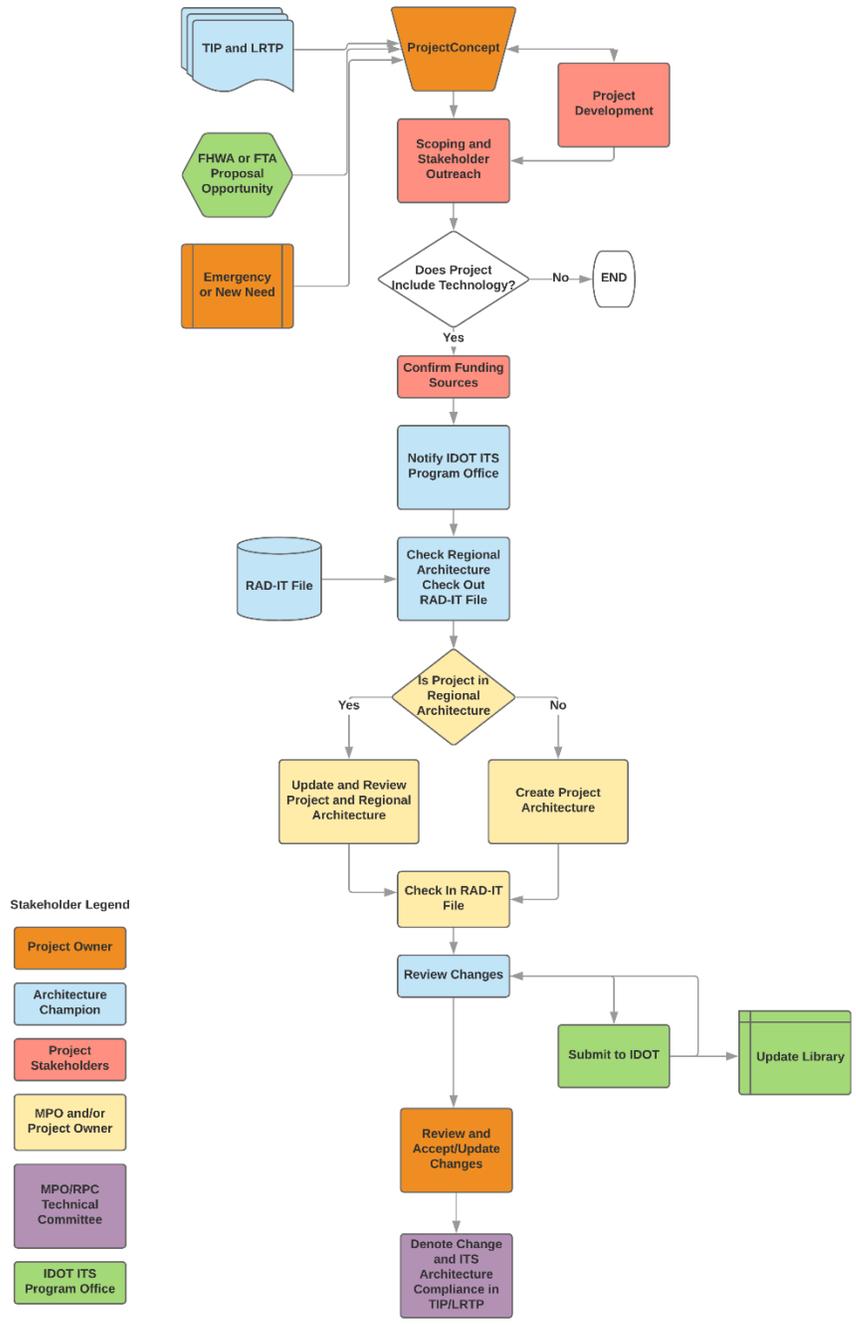


Figure 4 - Regional ITS Architecture Maintenance Workflow