BIM FOR BRIDGES AND STRUCTURES

TPF-5(372)

Software Vendor Engagement Plan

Recommendations for Software Advisory Group
activities to support TPF-5(372)
2019-11-15
Version 1.1

BIM FOR BRIDGES AND STRUCTURES
TPF-5(372)

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Introduction

This report, the "Software Vendor Engagement Plan", documents the components and timetable to enable effective engagement with the software community in the US infrastructure market. The overall purpose of this engagement is to spur vendors to create software solutions to support the development, implementation, and adoption of new BIM-based workflows and standards for AASHTO members in the design, procurement, construction, and operations of bridges and associated structures.

The Software Advisory Group (SAG) was established as the primary interface between software vendors, the consultant team, and pooled fund members. The consultant team uses the advisory group to pass project information along to vendors interested in participating in the project, as well as acting as a communications conduit between the pooled fund members, the consultant team, and the vendors. As the project progresses over its 5-year span, the software development of support for the new workflows and standards will be managed from within the advisory group.

The Software Vendor Engagement Plan (SVEP) shall provide a reference to all project participants during the life of the project, guiding expectations and outcomes from all parties in clear terms. Questions, concerns, adjustments, or feedback regarding software engagement and development during the project should reference this plan.

Background

An integral part of the TPF-5(372) project is the support of making the new standards readily available in software on the general market and in use by AASHTO members and their service providers. For the greatest chances of success, it is important to involve all relevant software vendors throughout the entire project, working to continually inform them of requirements and facilitate their internal development processes and timelines to meet project goals and requirements.

The overall project strategy includes 5 main phases, or components, which span the life of the project and have aspects that touch the many stakeholders in different ways:

- Investigation & Exploration
- IFC Development & Verification
- Economic Analysis
- Industry Organization
- Development & Implementation

These phases are not linear or consecutive, but rather subjects of emphasis which help organize the many components, activities, and outputs of the project.

Within this overall project context, the participation of Software Vendors, can be summarized in the following table:

Project Phase	Vendor Participation
1. Investigation & Exploration	Determine current software capabilities in bridge design using BIM methodologies and technologies, as well as other lifecycle processes
2. IFC Development & Verification	Determine vendor capability for needed IFC support, based on IFC4.2; initial MVD support for Design->Fabrication and Design->Construction
3. Economic Analysis	Hard and soft cost data to help determine economic impact of BIM-based processes
4. Industry Organization	Engaging AASHTO, AGC/BIMForum, and buildingSMART International (especially for tech support and certification)
5. Development & Implementation	Prototyping, beta software development, testing, and eventual release of features and support to satisfy requirements

Table 1: Vendor Participation by Project Phase

Project Year-by-Year Summaries

This project is planned to develop over a five-year period, where each year includes a different sub-set of tasks and emphasis, all executed to meet the overall project goals. For the Software Vendor Engagement portion, the idea is to increase vendor involvement over the course of the project, beginning with simple outreach, recruitment, and education, and ending with certifications of software application implementations to meet the new AASHTO standards.

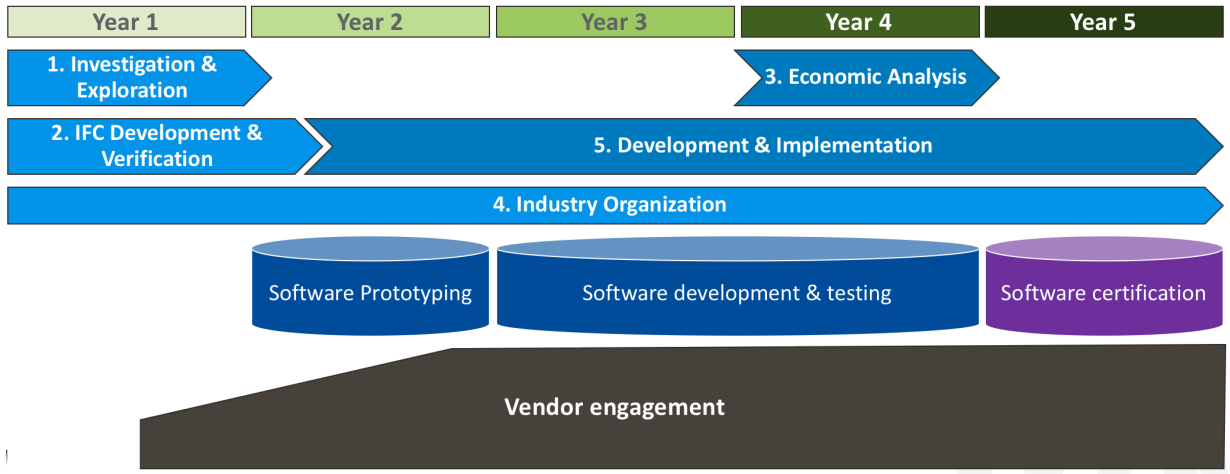

Figure 1: Proposed Vendor Engagement Overview by Timeline

Year 1: Outreach

During the first year of the project, the consultant team is continually reaching out to the software vendor community, providing information, and accumulating interest and participation in the project. The intent is to involve as many different software solutions needed to cover the requirements of the many stakeholders throughout the lifecycle of bridges and associated built structures, as identified by the project team and owners.

The consultant team will also continue to create, update, and disseminate material and project information to the software vendors, providing further clarity for them to make decisions on further participation. This material will include project timelines/schedules, project goals and requirements, …

Year 2: Commitment and Planning

During the second year of the project, the software vendors who have been previously identified and engaged in Year 1 activities will be asked to formalize their participation in the project by signing a Letter of Intent (See Appendix A) which spells out their commitment to fulfilling the goals of the project in providing support for IFC-based data exchanges, and any other open standards identified, in software available to the industry marketplace by the conclusion of the project.

During this year, the consultant team will engage with the pooled fund members and vendors to further clarify and detail the overall software development, testing, and deployment timeline, as well as providing user requirements for vendors. Dialog between the consultant team and software vendors will also help provide the consultant team with feedback, expectations, and guidance from each of the vendors regarding their respective development plans. The intent of the individual dialog is to insulate vendors from disclosing proprietary information to competitors, but still exchange pertinent information regarding project commitment and ability to support it.

In addition, there will be initial testing/validation of IFC4.2 using the Bridge Design Transfer View, developed by the buildingSMART IFC Bridge project team along with the proposed IFC4.2 schema. Details, relevant configuration material, and test files will be provided to selected vendor(s) by the project team.

Year 3: Development, Implementation, and Testing – Phase 1

During the third year of the project, the first steps of software support should be undertaken. This includes core technical development to support IFC4.2 data exchange and data encoding in software. Beta testers shall be identified and a process for distributing Not-For-Resale (NFR) beta versions, test files, issue reporting, and tracking shall be established.

Candidate MVD(s) will be delivered as part of the initial development, implementation, and testing to help vendors verify IFC capabilities and establish benchmarks for further development.

The consultant team will also engage with buildingSMART International, or another specified entity, in discussion about providing certification services of software to support the TPF-5(372) MVDs.

Year 4: Development, Implementation, and Testing – Phase 2

During the fourth year of the project, the maturity of initial development, beta implementations, and testing will allow testing and review of candidate MVD(s) to establish their final form.

While development and beta testing continue, planning for final deployment, documentation, and end user orientation and training will occur.

Year 5: Certification and Deployment

During the fifth year of the project, certification of software implementations for the new standard exchanges will be set up and undertaken.

Final deployment of certified versions will be determined with corresponding documentation and training materials to be delivered.

Beyond Year 5

By the end of Year 5, it should be possible for AASHTO members and their service providers to implement the new standards with certified support from software used by all the stakeholders. It is assumed that these new AASHTO standards and data exchanges will be gradually integrated into the processes of its many members at different times and rates, according to feasibility and workload.

Software Vendor Engagement Plan

The following section of this report provides a more detailed description of each project year's planned emphasis, activities, and goals.

Year 1: Outreach

The primary goal of Year 1 is to engage the software vendors serving the industry and build up the project Software Advisory Group to include as many as possible to meet the needs of the pooled fund members by the end of the project, ultimately in deployment of software to support implementation of the new AASHTO standards.

Recruitment

Year 1 activities include continued outreach to, education, and recruitment of software vendors to join the project Software Advisory Group and address project stakeholder needs for project lifecycle. As part of the recruitment effort, a database of vendors will be established to track vendors and their activities including:

- Vendors contacted
- Primary contact information
- Vendors opting to initially participate
- Meeting/workshop/event attendance
- Quarterly (and more frequent) meetings
- Promotion at industry events (bSI, AASHTO, and general infrastructure industry)
- Product name and type
- Products' support for standards (support type, e.g. IFC import/export, MVD, etc., and version implemented)

Communications

HDR has initiated a Microsoft Team for the project – accessible to participants via the web, mobile, and desktop apps – providing a centralized location for the collection and distribution of information and materials to all project participants and stakeholders. Through Teams, the Software Advisory Group and its members shall communicate with the rest of the project members – advisory group peers, consultant team, and pooled fund members. The consultant team will be responsible for keeping information updated and organized on the Team site.

In addition, there will be an effort to formulate a Marketing Plan to promote vendor participation to AASHTO and buildingSMART communities, as well as the general industry. This may include, but is not limited to:

- Websites (see Collaboration Forum information as a part of Task 5.0);
- Industry events (including AASHTO, buildingSMART, BIMForum, and other relevant industry conferences and events);
- Printed materials (for distribution at events);
- Email campaigns
- Industry press releases
- Industry press articles

Year 2: Commitment and Planning

Vendor Participation and Commitment

Year 2 of the project will push deeper into solidifying commitment by the software vendors to fully participate in the project and support the technical data exchange requirements. If needed, efforts to recruit software vendors will continue.

At this point, the consultant team will distinguish vendors who will commit to continued participation. This may include identifying “Project Participant” versus an “Observer” and formalizing the boundaries and benefits afforded one or the other, such as continued access to the Teams portal, or restricted access which limits the scope and detail of project information and progress. Vendors who choose to commit will be asked to sign a formal “Letter of Intent” (see Appendix A) which establishes the extent of commitment and support of the project on their behalf (e.g. development of solutions, creation of documentation, etc.), as well as the extent of expectations and support from the project management and stakeholders (e.g. technical support, user interactions, marketing, etc.).

The database will continue to be updated to reflect participation.

Product Development Planning

Also, during Year 2 it is crucial to engage the vendors in how they plan to support the data exchange standards through development of their respective software products used by the pooled fund members and their service providers. While Year 1 activities give them a general idea of the overall goals and process of the project, this product development planning step is necessary to verify that both vendors and pooled fund members understand what is needed to succeed.

The consultant team will be responsible for providing User Requirements to all vendors which may address various workflows, data exchanges, and pertinent software throughout the lifecycle of a bridge and associated structures.

The consultant team will work with vendors to establish an overall timeline that reflects the general development of software support, not specific to any single vendor, but an aggregate of vendor efforts to support the identified needs in the User Requirements. This timeline includes, but is not limited to:

- Core IFC4.2 support
- mvdXML support
- User Interfaces (UIs)
- Native software functionality enhancements
- Native-to-IFC data mapping
- Core Export / Import functionality

Initial IFC Testing/Validation

There will be initial testing/validation of IFC4.2 using the Bridge Design Transfer View. This MVD was developed by the buildingSMART IFC Bridge project team, which also developed the proposed IFC4.2 schema. The purpose of this initial IFC testing/validation is to confirm that the Bridge DTV MVD is an appropriate baseline to use for the development of other MVDs identified in the project Roadmap. The project team will communicate with the vendors and select one or more of them to initially test modeling and IFC export of the bridge model concepts. The results of this testing will not preclude or disqualify any vendor from further participation. It is meant to help the project team determine the best route forward in the development of data exchanges for the project.

Exchange details, relevant export MVD configuration material, and test files will be provided by HDR. Validation of exports will be done in conjunction with AEC3.

Test Files

The consultant team will also work to specify the content of test files for use in Years 3 & 4 by the vendors and designated beta-testers. These test files should include base “unit” examples, where a single object or type of object is modeled and exchanged, aggregate unit examples, a bit more complexity with multiple units to test certain spatial and connective relationships, and finally more complex “complete” models which reflect existing or potential design and built conditions to ultimately test the data exchange support. Besides varying in scope or extents, these test files may also vary in detail of geometry and information (aka LOD, LOI, or LOX), to address the different data requirements during multiple stages of a project lifecycle.

In addition, the consultant team and vendors will work to establish and document procedures for the use of the test models, including their creation in different tools, exchanges, verification of files produced (aka Quality Assurance or Quality Control), the reporting of results, as well as the reporting, tracking, and resolution of issues.

Communications

Communication and marketing activities established in Year one will continue with increasing frequency of project meetings with vendors (e.g. monthly) and further project promotion at identified industry events.

Year 3: Development, Implementation, and Testing – Phase 1

Initial Core Development

Year 3 of the project marks the beginning of actual development work in software. It is expected that throughout the year, vendors will pursue internal developments based on the planning documentation from Year 2, including but not limited to:

- Core support for IFC4.2 (IFC5?)
- Mapping of native objects and attributes/properties to desired IFC objects and attributes/properties
- Core IFC export / import support
- mvdXML support

The consultant team should be able to track progress of all vendors who have committed to continuing participation and support development. This includes monthly, if not bi-weekly, meetings with developers to update progress and project schedules.

Beta Testing Program

As development proceeds, the software beta testing program shall be established. This includes the identification of beta testers, identification of software to be tested, planning of testing schedule, signing of vendor NDAs by beta testers, distribution of NFR/beta version software licenses by vendors to designated testers, and launch of issue support, reporting, tracking, and resolution process and tools. Selected beta testers shall include a variety of project stakeholders, as defined by the IDM and the particular workflow/data exchange identified for further development under this project. These testers may include:

- Designers
- Engineering

- Contractor
- Owner
- Fabricators
- … and any other software users necessary to carry out the identified workflow(s).

It will be crucial for the consultant team to deliver the "Candidate version" of the MVD(s) identified for further development under this project to the testers and software vendors. This includes the mvdXML file as well as any other text-based specifications.

Test files, including native and IFC, will be created by beta testers based on the specifications from Year 2 and NRF/beta software delivered by vendors.

Preliminary Certification Discussions

In anticipation of certifying software for its support of the MVDs defined by the AASHTO standards, discussions should commence with buildingSMART International (bSI), or another viable entity, to set up an AASHTO-specific software certification regime. It is assumed that bSI could provide such services on their "b-cert" platform. Other viable alternatives can be offered and discussed. These discussions will include, but not limited to:

- MVD(s) to be tested;
- Identification of development time by bSI, or others, to set up AASHTO certification;
- Identification of AASHTO representatives to administer certification;
- Identification of costs by bSI, or others, to set up and maintain certification;
- Plan for funding of certification through AASHTO investment and vendor fees;

Such discussion will enable bSI, or alternative, to begin work on the AASHTO certification in anticipation of beginning the first testing by vendors by the end of Year 4/beginning of Year 5, with preliminary testing of the platform in the later quarter of Year 4.

Communications

Communication and marketing activities established in Year 1 will continue with increasing frequency of project meetings with vendors (e.g. bi-weekly) and further project promotion at identified industry events.

Year 4: Development, Implementation, and Testing – Phase 2

Over the course of Year 4, User Requirements, standard MVDs, and software implementations should reach final status and full, deployable maturity.

Late-Stage Beta Testing

Beta testing begun in Year 3 shall continue with the goal of wrapping up the majority of development by the end of Year 4. During this time period, MVDs used for testing should reach “Final Standard” status and be available for late-stage beta testing.

Deployment Planning

At this point, the consultant team and software vendors should develop a plan for the deployment of the “final” versions of software developed to support the identified standards. This assumes that the software will be made available to the general market, as well as AASHTO members and their service providers through the usual means of each software vendor’s release schedules and processes. The planning will help AASHTO members and service providers anticipate availability and timing for acquisition and deployment in their own organizations.

In addition, the deployment planning should include coordination of documentation and training necessary to inform users about the new processes, workflows, functionality, and data exchange standards and how they are supported in each of the participating software platforms.

Certification Development

Year 4 should see the development and testing of the Certification Platform, as identified in Year 3, in anticipation of vendors being prepared to apply and run through the certification regime in Year 5. All costs and funding necessary to proceed with development and maintenance should be finalized at the beginning of the year to allow development to proceed.

The consultant team will provide the bSI Software Certification team, or alternative team, with the final test models, mvdXMLs, and instructions/documentation for software vendors to utilize in the certification process. The TPF stakeholders shall have identified representatives to administer software certification in cooperation with bSI or alternative and have said representatives trained by bSI or alternative.

The project team should work with the bSI Software Certification team or alternative to develop documentation for the processes, cost schedule/fees, promotional materials, and certificates/logos for the certification regime.

Communications

Communication and marketing activities established in Year 1 will continue with increasing frequency of project meetings with vendors (e.g. bi-weekly or weekly) and further project promotion at identified industry events.

Year 5: Certification and Deployment

Certification

By the beginning of Year 5, set up of the bSI b-cert platform, or alternative, for AASHTO certification should be complete. Documentation of processes, cost schedule/fees, and certificates/logos, as well as promotional/press release templates should be complete. Processes and templates for providing information on AASHTO and certification websites will be complete.

Deployment

After a software vendor's certification is complete and officially granted by the AASHTO Certification team, software vendors will make certified versions available to the marketplace. Promotional efforts will be coordinated between the consultant team, AASHTO, and the software vendors to announce availability.

At the time of deployment, documentation and training to support the workflows and standards should also be made available as either inclusions in the software's standard user manuals, addendums to said documentation, or special documentation to address the AASHTO standards.

Communications

Communication and marketing activities established in Year 1 will continue with increasing frequency of project meetings with vendors (e.g. bi-weekly) and further project promotion at identified industry events. There will also be an increased AASHTO member outreach to help in the education and training in the use of the new standards in available, certified software.

Appendix A: Software Vendor Letter of Intent to Support TPF-5(372)

The following items are recommended to be part of the Letter of Intent, to be signed by authorized representatives of each of the vendors choosing to participate in TPF-5(372) beyond Year 2. The final form of the letter shall be drafted in Year 2, after review of these items from project stakeholders.

Benefits to Vendors

- Immediate availability to marketplace and deployments of AASHTO standards to new projects across all 50 states;
- Technical support by the project team and its consultants in the development and deployment of support for the new standards;
- Marketing by the project team to AASHTO members, the buildingSMART International community, and infrastructure industry in general regarding participation;
- Discounted certification fees.

Responsibilities of Vendors

- Providing NFR and beta versions of software for testing, per consultant team requests;
- Have membership in buildingSMART International (bSI) or the US Chapter for bSI, as well as participating in the bSI Implementation Support Group (ISG);
- Participation in all project meetings;
- Participation in AASHTO and AASHTO member events, as identified by the consultant team;
- Participation in issue tracking program for project beta testing;
- Certification of software after completion of development to support standards;
- Commitment to make applicable, certified software version available to the marketplace by the end of Year 5 of the project.

Additional Notes

It is not expected that vendors will need to share proprietary information regarding their own tool development. However, vendors should accurately respond to project stakeholder requests for clarification on development progress to support their project goals.

There is NOT a requirement for any Intellectual Property (IP) transfer or exposure to the project or project participants.