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APTI - Technical Committee for Documentation BIM Newsletter

Technical Committee for Documentation

APTI INTERNATIONAL BIM NEWSLETTER

BIM Project in the Spotlight

Nebraska State Capitol Project

Creating a Custom App to Integrate Contextual Data into BIM

What happens when technology makes preservation work easier and more efficient? When a particularly complex preservation project presented itself, BVH Architecture took a researcher's approach to finding a solution to help architects and preservationists. Fusing BIM and manual documentation through technology created a newfound ease and efficiency that led to better results.

The Nebraska State Capitol is the most recognizable building in the state of Nebraska, drawing as many as 100,000 visitors a year. Its design is the result of a nationwide competition won by American architect, Bertram Goodhue, in 1920. The building was the nation's first statehouse design to radically depart from the prototypical classical form of the United States Capitol. Constructed in four phases from 1922-1932, the building was completed just under the $10 million budget.

Nebraska State Capitol, Lincoln, NE
designed by Bertram Goodhue, 1922-1932

The Capitol is now undergoing an eight-year phased interior rehabilitation and HVAC replacement project. The historic steel windows will be preserved while integrating new MEP systems.

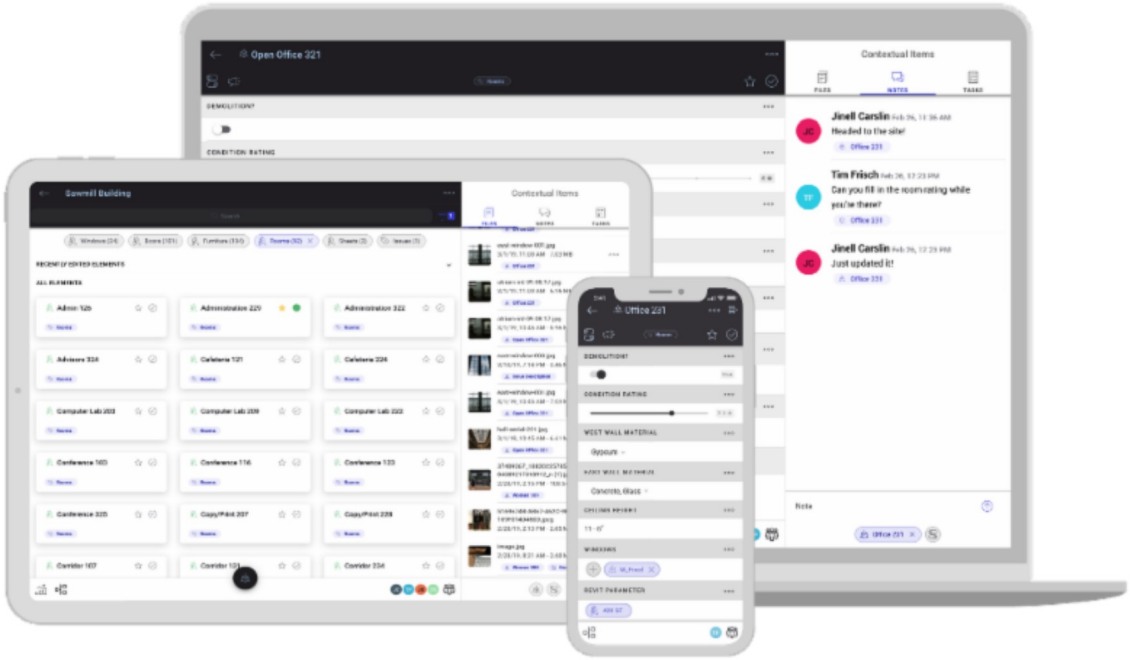
The project is large and complex, covering approximately 600,000 square feet of conditioned space. One of the first tasks of the design phase included fieldwork, investigation, and a detailed survey of each of the 1,365 rooms and 1,191 windows. The scale and multiplicity of solutions for this project necessitated a different approach to the collection, coordination, and design of solutions. After running through the available options, our team at BVH decided that there must be a technological solution that would help us gather and organize this data while also tying it to BIM.

We started researching to find out what tools could help us. However, we quickly learned that while there were many apps that addressed different parts and pieces of what we needed, we found no single solution. Next, we decided to take a new approach and looked to the programming and computer science industry and how they work. At the core of nearly all technology development is open-source software and libraries. These collections of code do specific things and are kept inherently general so they can be as adaptable as possible. These libraries are free for anyone to use. They are developed by tens to sometimes thousands of people contributing pieces of code in an organized manner to improve its purpose. The benefit is that instead of recreating the wheel each and every time a new piece of software is built, these libraries can be plugged into a software program, performing their specific task.

The initial problem of organizing and analyzing the reams of available data was solved by leveraging these open-source libraries and technological advancements to build a solution in-house. The result is a multi-platform application with the ability to layer contextual data on top of an already detailed BIM model. Specifically, it allows the team to collect information in the field on tablet PCs, iPads, and other portable devices, and immediately tie that information to specific model elements, like rooms, windows, and doors. The users are able to adapt the data required specifically to their individual project, tailoring to character-defining features and building elements that need to be assessed, documented, and evaluated in the field.

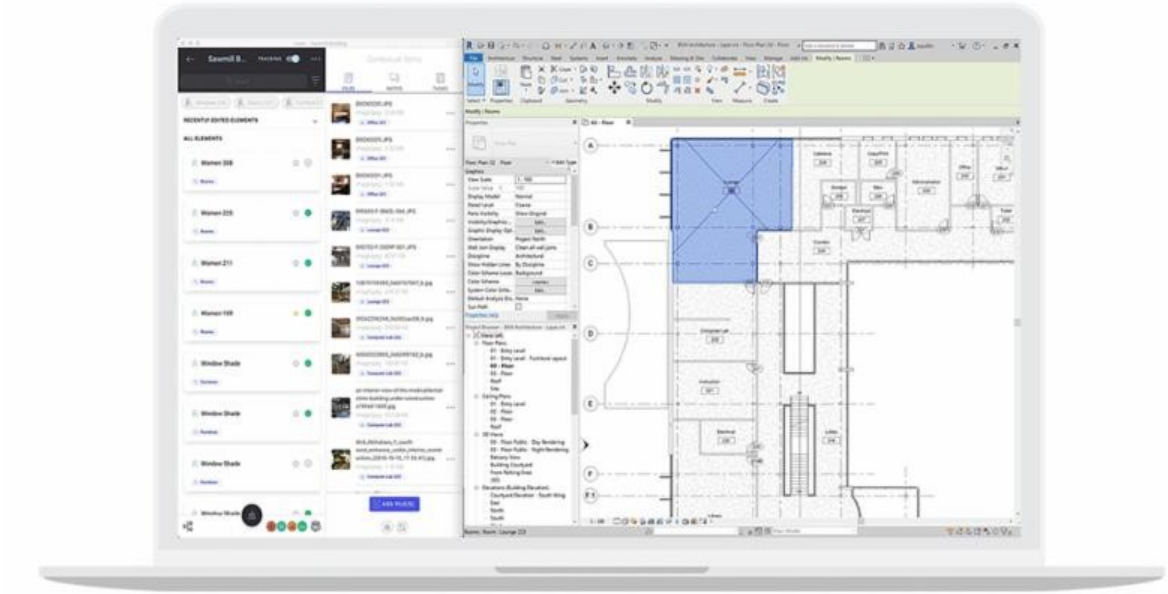
The Nebraska State Capitol project required our team to collect more than 57 data points in each room

When working in BIM, the team has instant access to all information collected via a dashboard that shows the related information as the user navigates through the model. Not only does this dashboard allow users to view and edit data that was collected, but the team can also add tasks and communicate with messaging in the context of specific elements like rooms, windows, and doors. This makes tracking progress and design of each of these solutions much easier to coordinate.



Layer is a flexible, multi-platform app that can be used on most browsers and mobile devices.

This application has since evolved into the Layer app. The app has the ability to layer contextual data on top of the existing model in BIM, organizing and curating all of the information gathered during the assessment and documentation process. Perhaps most importantly of all, the app is adaptable in the field, allowing for individual and unique parameter additions and revisions in real-time. Layer integrates with Revit, allowing it to link directly to BIM and allows for the parameters housed within each digital tool to be readily accessed.



Layer is designed for users to capture building information in the field and for team members back at the office to view that data instantly in BIM.

As the project progressed, so has Layer. We added more features and tools until it became something that not only worked for this one project, but could be adapted to any project - new construction, historic preservation, or renovation. Layer quickly became an invaluable BIM integration to allow the project design team to leverage digital technology at a historic, iconic building during complex, major rehabilitation and preservation campaigns.

This BIM Project in the Spotlight was brought to you by:

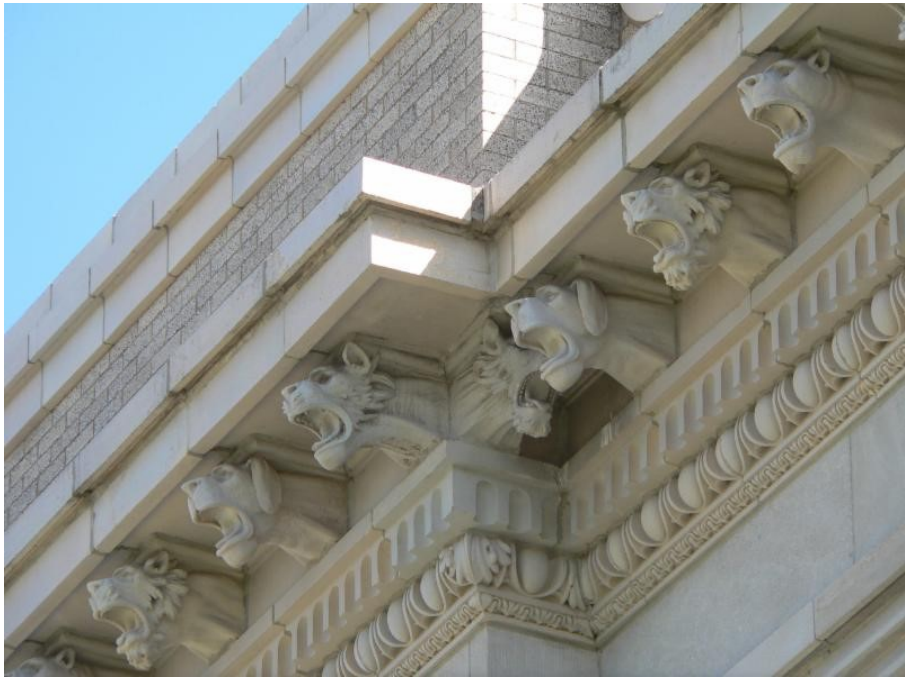
Zach Soflin - Layer - zach@layer.team

Modeling Complex Features

When working in Historic Preservation it's easy to get caught up in the details of the project and we

often want to be able to convey character detail in our models. However, it is important to understand that BIM is ultimately a database of information not necessarily a repository for every cranny and crack of a building. Even though these features may exist in great detail in point cloud data provided by your surveyor, it does not necessarily mean they need to be fully reconstructed in a digital model.

For example, let's look at the repetitive cornice on the building shown in the image below. You could spend your entire budget on developing one nice parametric family in Revit that can then be repeated throughout the model. This may add great aesthetic appeal to the model and renderings, but from a BIM perspective those cornices are there only as placeholders for coordination - to later be detailed for reproduction or repairs. A more efficient process would be to simply create a mesh model from the point cloud data (or source a similar model from a manufacturer / supplier) and import it into Revit and add parameters to track for the remainder of the project.



One of the major considerations when modeling for historic preservation is will these elements need to go through several design iterations or are they just place holders providing aesthetic

value? It is a difficult line to draw but in this case the design is unlikely to change throughout the project, so why not save time and budget by modeling faster.

The time and place to have these discussions is during the development of the project's BIM Execution Plan* (BEP). In the LOD** (Level of Development) Matrix of the BEP, the team can discuss and define, element by element, not only what will be modeled but, also the detail to which it will be modeled.

*For more information about BIM Execution Plans (BEP), The U.S. General Services Administration has a very helpful description of BEP's on their Guidelines for BIM Software webpage.

**For more information about LOD standards, visit the BIM Forum's 2019 Level of Development (LOD) Specification .

This BIM Tip of the Month was brought to you by:

Mallary White - MICRODESK - mwhite@microdesk.com

BIM News

The U.S. General Services Administration (GSA) has recently filled the Office of Design & Construction's position for Building Information Modeling (BIM) Subject Matter Expert and Program Manager. The position was filled by Edmund Newman. Edmund has 28 years of experience as a licensed Architect, 20 years in Project Management, and has been with the GSA for 12 years. Edmund has a strong background in managing the design and construction of a broad range of projects both in new-design, mid-century-modern rehabilitation, and historic preservation. Edmond's historic preservation experience includes work in Chicago, on Daniel Burnham-designed Park Field-houses, the Garfield Park Conservatory, and restoration of Mies' buildings on the campus of IIT (along with Rem Koolhaas' new Campus Center). More recently he managed the master-plan, restoration,

and new-construction projects on the St. Elizabeth's Campus in Washington, DC.

Edmund's current role in the GSA is to strengthen, adapt, and standardize GSA's national work product within the evolving world of BIM technology. He will be working to ensure that new technologies are fully integrated with the GSA's goal of providing design-excellence in the most efficient manner possible during all construction projects. We look forward to seeing how Edmund and the GSA will continue to encourage the use of BIM and emerging technologies in the Construction and Historic Preservation fields. There are still efficiencies and nuances to be learned in the world of BIM in historic preservation, so it is exciting to see that the GSA has employed someone to focus on this important topic.

Edmund Newman, AIA - National BIM Program Manager, Office of Design & Construction

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What would you like to see in the next BIM Newsletter?

We would like to hear from our readers to learn what they are interested in learning more about in the world of BIM! Do you have any BIM Tip Requests, or have you been having any issues with BIM that we can troubleshoot together? Do you have any great Case Studies or Lessons Learned you would like to share with all APT members? If so, please contact us at committee@apti.org and we will try to include it in our upcoming newsletters.

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