Technically Speaking

SOFTWARE-BASED COLLABORATION IS INTEGRAL IN TODAY'S DESIGN AND ENGINEERING COMMUNITIES

by Luigi Benetton

Buildings are single systems made up of well-integrated components. Yet buildings get designed using multiple systems that do not always integrate well, a situation that keeps design and building processes prone to inefficiency and error.

But that's changing. Software tools – from project management to computer-aided design, to analysis, to accounting and so forth – used by architecture, engineering and construction (AEC) professionals are evolving to better enable the 'conversations' their users need to have.

Handling a request for information (RFI) is a prime example of past inefficiency versus current streamlining. "You would print it, fax it, get a handwritten signature, have it faxed back, and then put it in a folder," explains Patrick Baker, president of Constructive Solutions for Business Inc, a Canadian implementer of Sage Timberline Office construction and real estate management software. "Now, you email links to everybody you need answers from. In many cases, they can respond right in the body of the email and their responses go to your database, which updates the people who track the RFI."

The logic illustrated by Baker's example hasn't always made itself apparent in practice. For instance, different departments within a company (not to mention collaborators in different companies) each use software tools tailored to their specific roles. But this narrow focus can keep them from efficiently sharing information with collaborators. (Newer classes of software, like building information modelling – or BIM – gained momentum because they were born in an era of increasing awareness for the need for collaboration.)

Collaboration takes several forms, the most common of which may be BIM systems that act as hubs that other software packages 'plug into' to both analyze data and contribute to the model.

The sheer number of potentially useful intra-system connections need not involve BIM. For instance, specialized office management software can integrate with Microsoft Outlook, where professionals spend untold amounts of often-unbilled time.

According to a study prepared by BQE Software Inc., makers of BillQuick, ArchiOffice and EngineerOffice, industry professionals spend 4.5 hours each week reading and writing email. "Could you capture at least four hours and bill for them?" asks Shafat Qazi, the company's CEO. "That extra billing is enough to help justify the cost of a better system."

To get the 'satellite' applications to integrate can take some effort. "We must use BIM vendor APIs, which differ from vendor to vendor," says Marinos Stylianou, CEO of structural engineering software developer S-Frame Software LLC. "It becomes expensive for small companies to build these connections. It would be great to have standards that eliminate this extra work, but standards are hard to come by, and they change over time."

"There's a technical issue, stemming from the underlying philosophies baked into different systems that result in distinct features and data structures," says Erin Hoffer, AEC Industry Strategy and Relations for 3D design software developer Autodesk Inc. "It isn't a Lego type of metaphor. It's more like a set of languages. If you're Italian and speaking to somebody in Japan, you can't just translate word for word."

Sometimes end users also want to create links between systems they depend on. That desire prompts developers to create software integration tools that enable customers to create the custom links they want.

Such links can help reduce the workload even more. "We're working towards a system that's aware, that provides two-way validation of specifications compared to what's in the BIM model," says Mike Thornber, president of construction specification software developer Innovative Technology Inc. "I see a mechanism in the future whereby a spec writer can ensure specifications mesh with the building being designed, and the design team can also check specs for validity."

Such goals will be easier to achieve as common standards emerge for the data generated by AEC industry software. "The buildingSmart alliance™ is trying to get standards happening," notes Bruno Berti, senior director of product management for project management software developer Meridian Systems.

The Washington, DC-based buildingSmart alliance (bSa) is developing tools and standards that support full life-cycle use of BIM. Formed under the auspices of the National Institute of Building Sciences, bSa members work on technical and political fronts to drive BIM adoption, with the end goal of eliminating 31 per cent of current industry waste by 2020. Key to this goal are the open data standards alliance members are developing.

"They are working on these questions, determining what are the most important things that have to be said about a building," Hoffer explains.

Software, meanwhile, has to deliver those 'important things' to customers. "The industry has matured and people expect information from multiple systems in one report," Baker explains.

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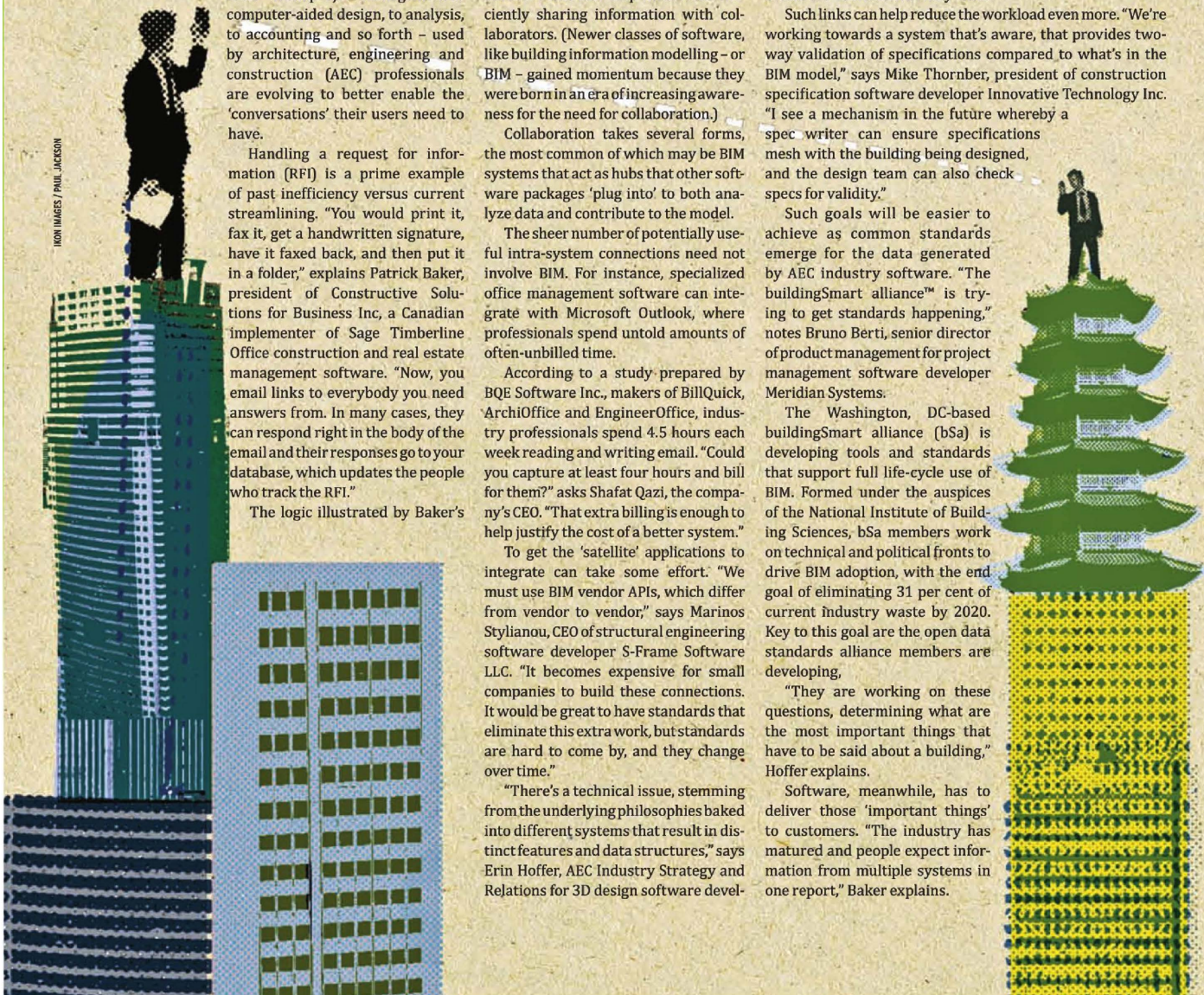
> **"The software has to handle more complicated models, more complete 3D models, more complex loading and different materials, and do all this more quickly to provide answers faster."**
>
> – Marinos Stylianou, CEO
> S-Frame Software LLC

Berti says web services, technologies that let two different applications 'speak with' one another, play an important role. "Web services can let people see information from multiple systems in one screen and write information to multiple systems using one form," he says.

In spite of the potential benefits, adoption of software-based collaboration hasn't been quick. True, the systems aren't cheap, but Thornber figures the learning curve keeps many away as well. "Everybody is so busy producing, they don't have time to learn," he opines.

The 'learning treadmill' driven by evolving technology rarely appeals to people who spent years training on and becoming proficient using tools they now master. That proficiency, part of their value-add, may diminish in their employers' eyes should they regularly switch tools.

So the need to manage change makes developers maintain an evolutionary (and not revolutionary) pace of change.

To lower resistance to change, certain software developers adopt interfaces common among their customers. Several developers, for instance, use Office Business Applications (OBA) to enable customers to create forms in Microsoft Office applications that look exactly like what they have used for years. Users can, for instance, link spreadsheet cells directly to database 'cells' for online or offline use in a dashboard, input form, or both.

Technologies like OBA bridge the gap from now until legacy interfaces eventually fade away. To use the earlier RFI example, newer interfaces show only the specific RFIs people need to contribute to and, depending on their roles, the fields they need to complete in each.

Building information generated today remains useful to building stakeholders throughout a building's useful life, so software developers need to guide the evolution of their software to ensure today's BIM information, CAD files and other digital dossiers remain legible to tomorrow's software.

Expect AEC professionals to also demand improvements in today's tools that enable them to account for forces like peak oil, globalization, evolving legislation and ever-increasing environmental awareness.

Engineers, for instance, will want models they build to more closely represent actual behaviour of structures they design. "The software has to handle more complicated models, more complete 3D models, more complex loading and different materials, and do all this more quickly to provide answers faster," says Stylianou.

Demand for increased efficiencies and LEED certification will boost AEC use of RFID technology. "We're now learning that you can squeeze a lot of cost by optimizing the supply chain," Berti says. "It's like just-in-time (JIT) delivery, promoting more efficient material and labour tracking."

"There's pressure to make more complicated software easier to use," Baker says, noting demand for better visuals and improved navigation within software. "That's good pressure to have."

Not that all developers will succumb to the pressure. Software tailored to the construction industry tends to be very sophisticated and was never meant for the casual user. "If something's really easy to use," Stylianou says, "it runs out of depth after a few months when people bump up against its limits."

"But customers want both depth and ease of use in the same package, and that keeps us improving it." ∎

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