EXECUTIVE SUMMARY

Software-as-a-Service (SaaS) offers tremendous benefits to companies of all kinds, reducing their software- and hardware-related workload, saving them money, improving their productivity, and – perhaps most importantly – reducing risk. While many architecture, engineering and construction (AEC) organisations were once understandably cautious about outsourcing key applications and data, it has become increasingly common, particularly for project-based team-working where conventional IT infrastructures are not always the most efficient solution. Trends in mobile working are also increasing SaaS adoption, while building information modelling (BIM) and ‘Big Data’ may further expand its use.

SAAS – AN INTRODUCTION

Software-as-a-Service is similar to outsourcing. Essentially, massively scalable IT-enabled capabilities are delivered “as a service” to external customers using internet technologies. While sometimes considered a recent innovation, the concept of information technology becoming a utility service, like electricity or telephony, was first aired in the 1960s, and eventually became a commercial reality in the 1990s. Since then, the concept has grown in popularity, even among risk-averse industries such as construction and real estate, and is now seen as a strategic opportunity for organisations to mitigate some of the risks associated with hosting certain IT capabilities themselves.

TRADITIONAL APPROACHES TO IT

For many years, most computer users expected their computer applications and data to be readily available locally. If they were working on stand-alone machines, the software and data would be stored on the computer’s hard-drive; if they were working on a corporate network, applications and data might be managed from the organisation’s central servers. Software was largely seen as ‘shrink-wrapped’ - developed by software vendors and sold off-the-shelf to be implemented by the end user or by an in-house IT department.

IT staff installed, operated, maintained and supported different hardware and software of various vintages, and integrated different applications so that information could be securely shared between different disciplines, departments and individuals. While robust and efficient IT and telecoms management can be critical to an organisation’s success, it is not usually a core competence – particularly for construction businesses. IT, therefore, is an overhead that needs to be carefully managed.

However, the nature of computer software began to change during the 1990s. The advent of the worldwide web in 1993 saw growing numbers of users accessing online information and then other resources; during the late 1990s software vendors started to deliver applications via the internet, and end-users, initially constrained in what they could and couldn’t do online, began to use the internet as a matter of routine.

Software vendors began to make their applications ‘downloadable’, cutting out the cost of disk manufacture, packaging, distribution and hard-copy documentation. They also started to provide online training and other support services remotely rather than face-to-face.
The internet also became a way to repeatedly access and use remotely-hosted applications and data (eg: web-based email services, online banking, flight booking, online shopping, etc). Such business-to-consumer services soon extended to business-to-business markets, and in the AEC sector, making applications and relevant data available via the internet ‘on-demand’ was also attractive to some in the UK construction and property sectors, particularly for project team use.

Most construction project teams are temporary, fragmented, multi-disciplinary and multi-company in complexion. Co-location of teams can be costly and disruptive. Alternatively, creating fast, secure and reliable IT infrastructures for such teams was also challenging and expensive, particularly as they often had to be dismantled at the end of a project. However, by 2000, a new breed of construction-specific collaboration technology providers such as 4Projects (plus more generic collaboration tools such as Basecamp) were offering online platforms, accessed via a standard web browser, that could be used for centralised drawing and document sharing and for process management.

In this respect, construction, sometimes regarded as technologically backward, was among the innovators in adopting what was initially termed ‘application service provision’ (ASP) - Software-as-a-Service\(^1\) only became a more commonly accepted term in the mid 2000s.

**WHY GO SAAS?**

Combining the role of developer and supplier benefits the SaaS vendor, and by working for multiple customers they achieve economies of scale and skill which they can then translate into customer benefits, including:

- lower cost software – enterprise-class applications became affordable for and accessible to SMEs
- faster, more cost-effective implementation, training and ongoing support
- little/no capital outlay – with access normally via a standard internet browser, organisations rarely have to invest in new hardware/software
- more predictable expenditure on software, hosting and support – most vendors operate on a subscription basis, charging monthly, quarterly or annually for their services; in effect, IT is leased rather than purchased.
- less hardware, less depreciation
- more flexibility – ‘on-demand’ pay-as-you-go services can be turned on and off quickly
- greater reliability and availability of the application – software services are provided 24/7 from highly-resilient data centres with security, back-up and secondary systems impossible even for most corporates to replicate
- increased scaleability – processing, memory, bandwidth, etc can be scaled up or down as needed
- better disaster recovery – particularly in small firms, data back-up can be unreliable; cloud storage provides automatic back-up and improved security

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1 First coined in February 2001 by the US Software and Information Industry Association (SIIA)
• risk transfer – responsibility for ensuring constant availability of data to a project team does not rest with the ultimate client or a contractor or consultant, but is transferred to a specialist third party. Moreover, the latter’s IT focus means it is less likely to become embroiled in any construction disputes which may arise between the construction businesses, providing higher levels of neutrality and trust.

SAAS VARIANTS

As well as SaaS applications, companies can also adopt Platform-as-a-Service (PaaS) or Infrastructure-as-a-service (IaaS) approaches, or – most likely, particularly if a company needs to maintain some legacy applications – adopt a hybrid approach. Briefly:

PaaS allows application developers to develop and run their software in the cloud without the cost and complexity of buying and managing the underlying hardware and software layers – for example, many tablet or smartphone apps are provided via PaaS environments.

IaaS, as the name implies, uses physical or (more often) virtual hardware to provide a complete customer IT infrastructure, including storage, firewalls, load balancers, local and wide area networks, software, etc. As with SaaS, IaaS cloud providers typically charge for their services on a utility computing basis, the cost reflecting the amount of resources consumed.

A hybrid approach mixes segments from the public cloud with private domains. Virtual private clouds will typically be created where firms outsource some applications, such as collaboration, customer relationship management (CRM), email, data storage, etc, to cloud providers, but retain, at least in the short-medium term, some in-house IT capabilities.

WHY SAAS NOW?

In the early days of SaaS, particularly during the Dot.com boom, there were many concerns. These included concerns about:

• the financial stability of the SaaS vendors, many of which were then startups

• functionality, security and reliability of their services and applications – some were little more than web-enabled client/server applications (eg: using Citrix) while others were consciously developed as pure web-native tools

• the security and resilience of the SaaS hosting providers (many vendors outsource hosting to third parties such as Rackspace, Amazon Web Services, etc)

• data interoperability, and

• legal issues (contracts, service level agreements, data ownership, data protection, intellectual property, legal admissibility, etc) surrounding use of web-based services, documents and data.

However, over a decade after the Dot.com bubble burst, it is clear that surviving providers are robust and generating sustainable revenues. The vendors’ applications now have substantial track records serving numerous ‘blue chip’ clients; 2 clients and project teams have achieved measurable

2 It is significant that the UK Government has actively encouraged public sector use of SaaS through developments such as the G-cloud portal, which provides details of 100s of SaaS providers. 4Projects is one of the approved service providers on G-cloud.
time and cost savings and efficiency improvements through sharing a centralised ‘single version of the truth’. Hosting arrangements are now well understood. Vendors have shown how data can be archived, exported and imported into other similar systems, and ‘live’ process information can be extracted for re-use in back-office systems (eg: accounting). And construction and property people are now more sophisticated in their understanding and use of electronic information.

SAAS SUPPORTS DATA MOBILITY

In recent years, this sophistication has extended to increasing use of mobile hardware, also encouraged by growing availability of the broadband capacity needed to routinely exchange large volumes of data, and universal software interoperability standards enabling different applications on different operating systems to communicate seamlessly with each other.

Echoing their enthusiastic adoption of mobile ‘phones in the 1980s, construction people are now incorporating smartphones and tablets into their daily working lives (it is forecast sales of tablets will surpass sales of laptops in 2014, with mobile access to data also overtaking desktop access this year).

Organisations are grappling with the repercussions of this, formulating BYOD (Bring Your Own Device) policies and procedures, and advising employees on appropriate, safe and secure use (or not) of cloud-based services which allow access to data wherever the user happens to be and on any device. For example, cloud storage services like DropBox and Box.net are being used to share files among work groups, while note-taking and archiving tools such as Evernote can be used to synchronise knowledge across multiple devices. However, these may not always be appropriate for project-based people who need to securely share data and manage processes across an often temporary, multi-company project team.

Another factor in the growing acceptance and adoption of SaaS has been the development of cloud-delivered services by previously ‘traditional’ software developers.

Competing with the dot.com startups, design software providers like Autodesk and Bentley have ventured into SaaS-based tools, and traditional office applications are also available in the cloud. For example, Google Apps, launched in 2006, has taken a share of the market for office suites once dominated by Microsoft Office, offering web-based alternatives for email, calendars, word-processing, presentations and spreadsheets, plus online storage (Google Drive) – in 2008 UK contractor Taylor Woodrow was one of the first significant AEC industry organisations to adopt Google Apps for corporate use, having learned from its use of online project collaboration services since 2000. In 2011, Microsoft launched Office 365, a subscription-based online office and software-plus-services suite built around the Microsoft Office platform, including hosted versions of Exchange, Lync and SharePoint, and online storage via SkyDrive.

Again, while superficially attractive to businesses with a dispersed workforce, such tools will not meet the needs of people who want to share their latest and most accurate construction project information with clients and with partners in other supply chain companies.

3 4Projects was a founder member of the Network of Construction Collaboration Technology Providers (NCCTP), established to help create some common data standards between the different systems on the market. It remains active today in similar initiatives, such as Open BIM, which seek to ensure data interoperability between the different tools deployed in the AEC project eco-system.

4 Today Vinci Construction.

5 SkyDrive will be rebranded Microsoft OneDrive in 2014.
BIM AND ‘BIG DATA’

This challenge is also set to grow, as the industry begins to generate and manage more data during the planning, design, construction and handover of built assets. Professionals working on new projects will increasingly adopt building information modelling (BIM) processes, where digital information is collated not just to support design and construction, but to assist with scheduling, cost control and – beyond handover – future asset management.

In the UK, the government’s 2016 BIM mandate for public sector projects envisages use of SaaS-based project-centric ‘common data environments’ to support collaboration. This is a pragmatic recognition that, short of co-location, a transient, multi-disciplinary, multi-company, geographically-dispersed project supply chain, often encompassing micro-SMEs as well as national or multi-national firms, will only be able to collaborate through a ‘lowest common denominator’ platform – and the web browser offers the most practical online solution for this.

Discussion of BIM is also helping the industry pay more attention to the continued use of data beyond project handover. Operation and maintenance and facilities management will involve constant re-use of significant volumes of information collated during the design and construction phases, and will be augmented by additional data arising from use of the built asset itself – for example, owners will gather data on a building’s energy use, and will track repair and replacement of building components.

Efficient asset management will therefore be likely to require continued access to a constantly changing record about individual built assets, which can then be aggregated with, and analysed in relation to, data from other built assets. Organisational built asset data may also be augmented by data from other sources (eg: a retailer may look at built asset performance alongside ‘back office’ data from retail operations, plus ‘public’ open data on customer demographics, economic trends, etc). Such ‘Big Data’ will increasingly be captured and stored online, and kept constantly updated, for periodic interrogation and use by authorised staff across multiple organisations and in multiple locations, delivering almost real-time business intelligence (BI) – again, something that can only be realistically managed by adoption of SaaS-based approaches.

SAAS: THE WAY FORWARD

Since 2000, SaaS has become increasingly accepted, the vendors have proved robust and financially viable, their technologies are increasingly accessible across multiple operating systems and device types, and government clients and agencies are championing open, shareable asset information and open standards as a basis for better collaboration. 4Projects has been at the leading edge of many of these developments. We can attest to the growing industry appetite for SaaS technologies, and are well-placed to help our customers and end-users make informed choices about how they adopt SaaS to keep abreast of their markets.