WHY MULTI-TENANCY IS KEY TO SUCCESSFUL AND SUSTAINABLE SOFTWARE-AS-A-SERVICE (SAAS)

By Larry Aiken
As traditional on-premise independent software vendors begin to realize they must transform their products to the new “cloud” business model, they may rush to bring Software-as-a-Service (SaaS) offerings to market prematurely. Unfortunately, the DNA of an ISV is radically different from that of a service provider. ISVs are mostly in the business of writing software. And while the intellectual property remains important, efficient operating practices are also essential to success in SaaS.
Often, the “efficient operating practices” half of the SaaS equation isn’t recognized by the traditional ISV that aspires to become a service provider. As a result, vendors with an on-premise software application are seduced by the apparent low barriers to entry into the SaaS market with an architecture that leverages virtualization (such as VMware). This approach allows a software company to quickly offer subscription-based services to their initial customers. In the long run, however, this multi-instance approach simply won’t scale economically. A SaaS provider who leverages virtualization puts the long-term viability of the business at risk as more efficient SaaS competitors enter the market.

Faced with this dilemma, a strategy for deploying a “true” multi-tenant architecture becomes the obvious choice as it yields the most cost-effective approach to SaaS. However for most aspiring SaaS companies, this realization typically occurs far too late in the game. The ISV may already be far into the cumbersome and expensive process of modifying the application to support multi-tenancy. Or an extended delay occurs because the potential disruption to the business, to implement multi-tenancy, is deemed too risky. For these reasons, any ISV making the transition to SaaS should explore how best to achieve “true” multi-tenancy as early as possible.

**LIMITS OF VIRTUALIZATION**

Virtualization technologies evolved to help IT organizations improve the efficiency of their hardware resources by partitioning hardware to simultaneously support multiple applications and their corresponding software stacks (operating system, database, application server, etc.). Although superficially attractive for use in a SaaS environment, as the SaaS provider gains momentum with new customer acquisitions, it exponentially increases the complexity of its operations. This is especially daunting for the typical ISVs whose traditional business model was not focused on operations. However, the virtualization approach to SaaS appears to offer some benefits:

- **Time to market:** With this approach, there is no requirement to modify the application code.
- **Low barrier to entry:** The cost and risk associated with this approach are far less than the alternative of re-writing the application.

By leveraging this approach, the ISV can meet the market demand of delivering an application as a subscription-based service; from the client’s perspective, the application is running in the cloud. But the ramifications of this approach have serious pitfalls for the SaaS provider over the long term:

- **Cumbersome product upgrades:** With a virtualized approach, each customer’s stack must be upgraded with every new release of each product in the stack. If a software vendor with 10,000 customers must upgrade the database, then 10,000 separate database instances will need to be upgraded. Automation of this process may streamline it, but there is still a level of complexity introducing incremental costs and additional risks. As a function of customer demand and market pressure, it is routine for successful SaaS providers to upgrade their products on a monthly, even weekly basis. Keeping all customers in sync and up to date is a huge and costly undertaking.

- **Lack of tenant management tools:** Management tools for virtualization were never written nor intended for SaaS and only provide minimal benefits to a SaaS provider. Without out-of-the-box virtualization solutions, there are no automated tools to provide tenant provisioning, subscription management, or billing. Most important, there is no way to facilitate per-tenant customizations.

These two deficiencies are serious. As the number of customers of a virtualized application grows, the complexity and cost to operate it continues to grow as well. As Henry Olson, former CEO of Edge Dynamics, has said, “Virtualizing a single-tenant application ... is the definition of insanity.”

Henry Olson provides his views on approaches taken by ISVs to SaaS solutions. Click on image or visit http://bit.ly/ebhmza.
A fundamental question becomes, How many customers can a virtualized approach handle before it all breaks down? “The reality is I’ve seen people fall over at eight,” said Treb Ryan, CEO of OpSource, a leading cloud provider.

Treb Ryan talks about how many customers a virtualized approach to SaaS can support. Click on image, or visit http://bit.ly/fGvK2Z

Ryan also noted: “People are using virtualization to take traditional software and deploy it into the cloud ... as a way of faking ‘true’ multi-tenancy.”

Treblink Ryan also talks about “faking multi-tenancy using virtualization.” Click on image, or visit http://bit.ly/fn7kYw.

ADVANTAGES OF MULTI-TENANCY

Because a single instance of the application can be leveraged by all customers, the “true” multi-tenant application is the de facto architecture for the highest level of SaaS efficiency.

With this approach, all application infrastructure is shared with a single logical instance of the database, and the business logic is also leveraged across all users.

A “true” multi-tenant architecture has several key benefits for a SaaS provider:

- **Efficiency and Sustainable Scalability:** With a “true” multi-tenant architecture, SaaS providers have the ability to ensure the lowest cost of service delivery. Since essentially no new software resources are required for each incremental customer, the cost of on-boarding a new customer begins to approach zero at full scale, resulting in ever-increasing marginal revenue associated with each new customer.

- **Dramatic reduction in operational cost and complexity over the product lifecycle:** Since application upgrades can be applied to all tenants by simply upgrading the single instance of the application, the cost savings fall directly to the bottom line. OpSource’s Ryan says a “true” multi-tenant application (as compared to a virtualized application) can reduce a SaaS provider’s cost of goods sold (COGS) from 40 percent to less than 10 percent.

The most successful SaaS companies, such as Salesforce.com, NetSuite, and Success Factors, all utilize and evangelize this “true” multi-tenancy approach. So why doesn’t every SaaS company?

Simply stated, achieving “true” multi-tenancy can be downright hard and expensive. Re-designing an existing on-premise application is difficult, time-consuming, and fraught with considerable risk. It requires that the database schema (all tables and views) be changed to
support the concept of a tenant identifier (tenant ID). In addition to this requirement, each SQL access statement must be modified with a filter that returns data filtered by the tenant ID. What happens if a filter is forgotten? The security and integrity of all tenants’ data is compromised! Imagine one tenant running a query to return all sales leads for their company and receiving sales leads of its competitors.

Jeff Kaplan, Managing Director of THINKstrategies, a leading SaaS and cloud consulting firm, believes multi-tenancy is essential for market leadership, operational efficiencies and ongoing customer retention.

The obvious conclusion is that “true” multi-tenancy is a requirement for SaaS.

A “PLUG-IN” APPROACH TO “TRUE” MULTI-TENANCY

For most aspiring SaaS providers, an application rewrite is simply not a realistic option for two reasons:

- **Cost of Resources:** On average, it takes roughly 2 ½ years to weave a tenant identifier into the average-sized application. The direct cost for the development resources can range between $2 million and $3 million. Most developers have never undertaken such an initiative, which reduces the likelihood of success.

- **Organizational Impacts:** More than the hard costs of such an undertaking, there is a negative impact on morale caused by redirecting an organization committed to innovation toward the creation of a layer of infrastructure not directly associated with tangible product enhancements. Pulling valuable development resources off ongoing product enhancement goals for months or years also leaves an ISV at risk from attack from more agile providers during the conversion process.

Infrastructure and middleware software are well-understood concepts. The notion of layers of abstraction has been standard practice in the industry since E.F. Codd wrote his landmark white paper in 1969 introducing the concept of a relational database that gave rise to the client/server era. In 1991, James Gosling introduced the Java programming language. Within three years, BEA Systems was born with the notion of centralizing and abstracting business logic from the operating system. In other words, the Web application server was born.

Today, developers don’t attempt to write their own databases or application servers, so why would it make sense to undertake the complex process of building customer management constructs into the application? Ideally, multi-tenancy should be available as a “plug in” component just like an application server or database. The simple reason the paradigm of multi-tenancy as middleware has not yet reached critical mass in the SaaS community is that there is no legacy of vendors bringing such a solution to market as a product ... until now.

Corent Technology, Inc. is introducing the first Multi-Tenant Server™ (MTS). It is now possible to “plug in” multi-tenancy into any Web-based application to realize all of the benefits associated with “true” multi-tenancy in efficient and sustainable SaaS. The company’s website shows its devotion to this cause, from videos of industry experts to a white paper explaining the requirements and benefits of multi-tenancy. Corent is so bullish on the future, in fact, that it’s offering a no-cost conversion of single-tenant applications to multi-tenant SaaS solutions.

Weaving in multi-tenancy by hand is no longer necessary. Now it’s easier than ever to achieve “true” multi-tenancy.

ADDITIONAL RESOURCES

- Click here to find out what it takes to convert an existing single-tenant web application into an efficient multi-tenant solution, or go to http://ibm.co/gpfftb6.

- Click here to view Corent’s full video library of industry expert’s views on SaaS, or visit http://www.corenttechnology.com.

- For a limited time, Corent is offering to convert an existing single tenant application into a multi-tenant SaaS solution at no cost. To inquire please click here, or visit http://bit.ly/hqHOxC.