

UNIFACE AND MULTI-TENANCY

Multi-tenancy promises the best of both worlds: *the economy of resource sharing plus the control associated with in-house systems. Uniface realizes that promise cost-effectively*

Multi-tenancy allows multiple client organizations to share a single hosted software instance (or set of instances) yet to have what is to all intents and purposes their own application, with a tailored user interface, business rules and so on. For some time multi-tenancy has been put forward as a way to save money and improve scalability without losing control over business logic and data, but there have been some practical problems implementing it. Now, with the advent of Cloud computing, the motivation to adopt a multi-tenancy model is stronger than ever. Uniface offers an ideal environment for creating multi-tenant aware applications.

THE PROBLEM

More than ever before, companies need to find ways to cut costs. Sharing of hardware and software resources is an obvious way to do that, because it brings economies of scale through increased resource utilization and reduced operational complexity. However, worries about security and the impact of other users' activities on resource availability have limited the viability of sharing in the past.

Multi-tenancy is a possible solution to this problem. It is not a new idea, but developments like Cloud computing are making it more attractive because of their ability to support large numbers of users and their offer of capacity on-demand (i.e. elasticity).

WHAT IS MULTI-TENANCY AND HOW CAN IT HELP?

Multi-tenancy is the ability to run an application for multiple clients on a single software instance installed on one or more servers, typically belonging either to a VAR or to a hosting company such as Google, Amazon or IBM. Even though they are sharing software instances, tenants on a multi-tenant system should be able to operate as though they have an instance entirely to themselves.

Properly implemented, multi-tenancy therefore gives businesses the best of both worlds: economies beyond those available from other resource-sharing approaches, plus the security and flexibility they would get if they were still running their own systems in-house.



Figure 1: An advanced implementation of multi-tenancy will incorporate load-balancing

For software companies and service providers, the benefits of multi-tenancy include:

- Better resource utilization: by offsetting different tenants' requirements, peaks and troughs can be smoothed out so that idle time is avoided
- Simplification: the complexity of managing software, and the associated cost, is reduced because instead of multiple copies you just maintain one
- Data sharing: tenants on the same platform can share reference data (such as calendars) where appropriate – think Electronic Data Interchange
- Easy backups: all tenants' data is backed up in a single operation, bringing economies of scale and increased opportunities for automation
- Scalability: the multi-tenancy implementation can be configured to maximize concurrency so that tenants do not interfere with one another's activities, however many users there are, and load balancing can be used to share resources in the most efficient way
- Future enhancement: it's easier to take advantage of improvements in processor speed and infrastructure because you only need to port one version of the application.

Although most of the benefits of multi-tenancy arise from resource sharing, that does not mean that tenants have to have identical systems. Each tenant will still have their own unique user interface branding and their own business rules and workflow design.

UNIFACE CAN HELP YOU IMPLEMENT MULTI-TENANCY SOLUTIONS COST-EFFECTIVELY

A major obstacle for those who would like to realize the benefits of multi-tenancy is that a lot of current application software has been implemented in a way that makes it impractical to share instances with other users. To use these applications in a multi-tenancy set-up, either companies have to compromise on functionality or look and feel, or else the promised economies of scale are lost because the code exists in multiple versions.

Like the multi-tenancy concept itself, Uniface is about reducing cost and complexity. Not surprisingly, then, Uniface is ideally suited to implementing multi-tenancy in a cost-effective way.

Together, we can create applications that are multi-tenant aware

To get the full benefits from multi-tenancy, it is important to design applications in the right way. In particular, the application should automatically adjust its behavior for different tenants at run-time. Rather than coding different data models, user interfaces, business logic or reporting structures into the application, you need to drive the application from metadata that is invoked on a user-by-user basis. This metadata must be easy for developers to configure.

Uniface has always had this capability built in. Metadata can be used to specify which set of Uniface global objects to use according to which tenant is using the application. Objects can be messages, help text, menus, keyboard translation tables, device translation tables, language setups, images or panels. No coding is needed to cater for these different requirements.



Figure 2: Metadata can customize the application for each tenant

Inheritance allows customization plus re-use

Uniface's component template mechanism also helps with the job of making applications multi-tenant aware. This mechanism implements a common code base that is used by all components created by a given template. Whenever there is a change to constants, properties or the code inside the template trigger Uniface's overlay inheritance feature makes sure the updated values or code are inherited by all the related components at compilation time. This approach speeds up the development process and reduces the possibility of errors.

Uniface load balancing enables advanced multi-tenant applications

Load balancing is critical to the realization of the full benefits of multi-tenancy, such as maximum scalability and flexible resource sharing. Therefore, the load balancing capabilities of Uniface's URouter architecture are a valuable aid to implementation of multi-tenant solutions. From multiple threads through to multiple hosts, the URouter and its simple yet powerful API allow the construction of multi-instance, elastic, scalable architectures.

COMPLEMENTARY OFFERINGS

For new applications, it's straightforward to achieve multi-tenancy awareness with Uniface. For existing applications, our Modernization service can help, for example by bringing multiple versions of critical code together into a single metadata-driven version. This step will, of course, help with maintenance as well as opening up the option of multi-tenancy.

If you'd like to know more about our products and services in this area, Compuware Uniface Services can help.

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