



**Transforming
Enterprise Processes
through Virtual Worlds**

Recipe for Success with Enterprise Virtual Worlds

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Executive Summary

These are challenging times for businesses with the threat of a global recession, the bankruptcy and collapse of leading financial service institutions, and credit difficult to obtain. Business leaders are asking their employees to do more while budgets are pared back. In particular travel budgets are being slashed so business managers are being asked to rethink how they conduct events, training, and employee development without being able to meet in person.

There is growing interest in virtual worlds as a potential solution for business training and collaboration. Virtual world applications are significantly cheaper than video conferencing, telepresence, and traveling by jet, yet represent a more engaging and enjoyable learning medium than Web or audio conferencing and most Web-based learning content. Despite this potential there are few proof points that have been published indicating the effectiveness and ROI potential for virtual world applications for enterprises.

The Masie Center, a think-tank focused on enterprise learning and knowledge, and Forterra Systems agreed in the spring of 2008 to provide a “3D Sandbox” for members of The Masie Center’s Learning Consortium to explore their learning use cases in a virtual world. The Sandbox used Forterra’s On-Line Interactive Virtual Environment (OLIVE™) software platform that enabled members to prototype and pilot their learning use cases quickly and with minimal effort. The balance of this whitepaper describes the use cases for Accenture and ACS Learning Services, the results of their efforts, the lessons learned, and the “recipe for success” going forward for new organizations contemplating how to convert their interest in virtual worlds to tangible field pilot programs delivering business results.

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The Promise of Virtual Worlds for the Enterprise

Anyone who has followed the early popularity of virtual worlds such as Second Life in 2005 to 2007 knows there have been lofty expectations and significant media hype anticipating the transformation this technology would bring to education, businesses, and social networks. Applying that potential to corporate learning use cases has been difficult due to several challenges and impediments. Before we dive into these challenges, let's first explore why virtual worlds are both an improvement functionally and economically in corporate learning.

Over the last decade there have been three primary learning modalities used for employee development: 1) live instructor led, synchronous settings like a classroom or conference room, 2) electronic, synchronous learning through audio or web conference systems, and 3) electronic, asynchronous, self-paced learning which is often called e-learning. Most corporations have heavily invested in both web conferencing and e-learning systems as a cost-effective way to deliver learning curriculum to a geographically distributed audience.

There are several advantages and improvements virtual world learning provides relative to these modalities.

- Let's Have Fun. 3D applications are more engaging, immersive, memorable, and fun than web conferencing and most e-learning content. This is the reason why some of the most popular games in the world, like World of Warcraft with 11M global users, are based on virtual world technology.
- Practice until Perfect. Virtual worlds enable new learners to practice and role play their new found skills in a safe medium, often in the presence of mentors or instructors, before they apply their skills in the real job. These learners can now “fail safely” and without having to travel to participate. Some virtual world platforms like Forterra's OLIVE include 3D record and replay which enables instructors to critique the learner's performance based on what he/she said, interactions with other subjects in the scenario, or where they went in the scene.
- Add Gaming or Problem Solving. Virtual worlds can have quests or scavenger hunts for individuals or teams to assess how well they adapt to new challenges or work together as a team towards a goal. The use of dynamic problem solving in realistic looking 3D environments recreates real world situations for business learners.
- Mix Learning and Socializing. Many researchers and analysts indicate that the majority of knowledge accumulated by business workers comes from informal discussions with peers and colleagues, and not from a course. Virtual worlds can easily mix and match both formal courseware (SCORM or web-based content) with lighter weight documents (MS Office, videos, application sharing, blogs, and wikis) in whatever mix is appropriate for someone's curriculum. In addition, leading virtual world providers like Forterra are integrating in enterprise social networking tools like Lotus Sametime so it's easier to find, meet, and stay connected with colleagues.
- The Kids Want This Technology. Younger workers entering the workforce, typically called “millennials” or “the Internet generation” are very fluent with computer games and social networking software since they grew up using these tools. Many leading

companies are finding serious games to be a recruiting advantage for attracting top talent into their firm. The Millennials are attracted to firms who have invested in the software technologies they are comfortable with.

Now, let's turn our attention to the costs of virtual worlds compared to alternatives like audio, web, and video conferencing, and traveling.

Table 1: Virtual Worlds Compared to Other Communication Technologies

	Annual Cost per User	Comments
Audio Conferencing	\$500 to \$1000s	<ul style="list-style-type: none"> ▪ Benefits: Familiar, easy to use, ubiquitous ▪ Challenges: More expensive then perception, poor participant attention span, challenging following discussion context, no display of data
Web Conferencing	\$30 to \$100	<ul style="list-style-type: none"> ▪ Benefits: Familiar, easy to use, ubiquitous, inexpensive ▪ Challenges: Typically pay extra for conference call or audio VoIP services, poor participant attention span, challenging following discussion context, single media file presentation at a time
Virtual Worlds (Forterra's OLIVE)	\$60 to \$167	<ul style="list-style-type: none"> ▪ Benefits: Face-to-face like experience, multiple media file presentation, appeals to Internet generation ▪ Challenges: Larger client download, proven effectiveness, easy entry for employees
Video Conferencing & Telepresence	\$1000 +	<ul style="list-style-type: none"> ▪ Benefits: Face-to-face like experience, integrates with IP Phone system for easy meeting scheduling and launching ▪ Challenges: High up front investment often \$Ms for network infrastructure and equipment, users required to visit installed sites
Travel	\$1000 +	<ul style="list-style-type: none"> ▪ Benefits: Face-to-face meeting provides best overall experience ▪ Challenges: Highest ongoing cost, lost productivity due to travel time to destinations ▪ Assume 2 trips per year, \$500 per trip

Most enterprise-grade teleconferencing systems charge \$0.10 to \$0.25 per person per minute which can equate to thousands of dollars of expense per employee every year. As the table shows, virtual worlds are slightly more expensive then web conferencing alone however most companies must pay extra to use a conference call or a VoIP system for the audio portion of their web conference. The OLIVE system has excellent VoIP-based audio built into the platform so is cheaper then the combined cost of audio and web conferencing. Many meeting venues, such as training sessions or events that span several hours or days, cannot be effectively delivered through web conferencing. Virtual worlds are an order of magnitude less expensive then video conferencing, telepresence, or traveling.

Virtual World Challenges

Deploying virtual worlds in an enterprise has been challenging with many different hurdles to clear given how young the technology is. Here is a summary of the top hurdles.

- **Addressing IT Requirements**



Firewalls. Easily working behind and through firewalls is one of the top enterprise IT requirements. Forterra's OLIVE software can be deployed entirely behind a firewall. However before IT will support a larger deployment most projects need to prove their effectiveness through a pilot first. The pilots typically have their users connecting through their corporate firewall to an external hosted server cluster. Most virtual worlds have historically required a wide range of TCP and UDP ports opened through a corporate firewall to connect to the external cluster, which most IT departments will not support.

Work on Existing PCs. Most enterprise laptops and desktops are 1 to 4 years old, and were not specified when purchased to run graphically rich applications like virtual worlds.

Audio. The best experience in virtual worlds is based on natural discussion between participants using VoIP-based audio. To participate user's need either a headset with a microphone, or occasionally can use the built-in microphone and speakers in the PC.

- **Effectiveness & Confidence in Use Cases**



ROI. Enterprise senior executives have been reluctant to pursue virtual world applications until there is proven return on investment (ROI) behind the applications. There have been few case studies published of recognized brand organizations achieving measurable effectiveness of their virtual world use cases.

Trust. Some executives view virtual worlds as the twin to video games. The implication is they are frivolous entertainment where workers' alter egos get to indulge themselves as deviant avatars not representative of their company culture. Executives and IT want the confidence that when an employee says their digital identity is "Joe Smith" that it really is Joe and their avatar has the equivalent access permissions extended to Joe in real life.

- **User Adoption**



Usability. To gain wide spread adoption within an enterprise potential users must feel they can learn the new application quickly and be comfortable using the tool. This has to be true for all members of the user community ranging from the millenials, mentioned earlier who grew up with visual applications, to older generation of workers who rarely use a computer.

Client Download. Most virtual worlds use a client-server architecture with a client download in the range of several hundred MBs. The size of this download takes awhile to download over most networks and is hard for IT to support.

The 3D Sandbox Collaboration

The MASIE Center is a Saratoga Springs, NY think tank focused on how organizations can support learning and knowledge within the workforce. Elliott Masie, the Center's founder, leads the Learning Consortium, a coalition of 240 Fortune 500 companies cooperating on the evolution of learning strategies. The Consortium includes the learning leaders of some of the largest companies in the world, e.g., UPS, Allstate, Sears, Bank of America, the U.S. Departments of Defense and Labor, Wal-Mart, Home Depot, British Airways, Wendy's International, Ericsson Inc., and American Express. Every day throughout the year, Learning Consortium members turn to each other and the staff of The MASIE Center for benchmarking, networking, research and collaborative projects in the Learning and Training field.

The MASIE Center sponsored experiments in virtual worlds using the Second Life virtual world platform for several years given the interest in this area within the Learning Consortium. While the early experiments were successful the Consortium members ran into the challenges mentioned above applying their experiments into real 3D learning applications that would be acceptable to their organizations.

In the spring of 2008 Elliott approached Forterra Systems about inviting some of the advanced Learning Consortium members to apply their use cases into a hosted server cluster that would be managed by Forterra. The resulting collaborative effort was called the 3D Sandbox, to reflect the program goals of experimenting how to define, prototype, and pilot 3D applications within an enterprise learning field. At the end of the 6 months program the participants would share their successes, failures, and lessons learned with the other Consortium members at the Learning 2008 conference in Orlando, FL in late October.

Forterra Systems is a leader in providing private or public, enterprise grade virtual world technology for the corporate, healthcare, government, and education industries. Forterra's OLIVE™ (On-Line Interactive Virtual Environment) software enables organizations to

train, plan, rehearse, and collaborate using existing media technologies integrated into a compelling 3D virtual world. OLIVE runs on industry standard PC hardware behind or through firewalls. Recent releases of OLIVE provide a variety of media sharing features on 3D surfaces (MS PowerPoint, video, desktop applications, CBT or SCORM content) which are well suited for testing out the Consortium member's use cases. In addition to the hosted cluster Forterra also donated some training, program management, and support to assist the members with their use cases.

Use Cases and Results

The initial companies who planned to participate in the 3D Sandbox included Accenture, Allstate, ACS, Progressive Insurance, Hewlett Packard, Capital Group, Sears, and State Farm Insurance. Each company had one or two representatives who were defining their use case and guiding the prototype efforts as a small part of their job. About half the companies were significantly delayed developing their use cases or eventually dropped out when they were not able to get support for the project from their IT departments. In some cases corporate policy required IT to open firewall ports or to provide a server to host the 3D content for the intended use case to proceed. Despite the very compelling ROI behind some of these use cases it is difficult to gain IT backing, even for a 6 month pilot, due to the backlog of projects IT is constantly having to service. As of late October Accenture and ACS were the two companies who successfully piloted their use cases and got corporate permission to be included in this white paper.

Accenture

Company Description

Accenture is a global management consulting, technology services and outsourcing company. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. They are the world's largest consulting firm with fiscal year 2008 revenues



Figure 1: The Accenture team meeting in a room specifically tailored to their needs

of \$23.4B and more than 186,000 employees. The company divides its practices into five main operating groups — communications and high technology, financial services, public service, products, and resources — that encompass more than 15 industries. Accenture operates from more than 150 locations in 49 countries.

Use Case

Accenture Education, the group responsible for employee learning within Accenture, was interested in the future of 3D worlds for learning and evaluating the business learning applications. Bob Gerard and Bryan McCart from the Accenture Education team led Accenture's participation in the 3D Sandbox. Both have been exploring and testing various virtual world technologies for a couple of years, so they knew of the

potential behind the technology. But Bob and Bryan also understood the hurdles to clear to demonstrate that a 3D environment had training features equal to or better than the current training approaches, that users would accept this training medium, and that the business case for a wider deployment made financial sense.

Specifically, they wanted to prototype an experience that would incorporate 1) collaboration tools, 2) a mix of online/virtual delivery (CBT and virtual discussion/activities), and 3) an overall immersive and engaging experience. Key features they wanted to test out included the general interactivity functionality, application sharing, presenting, CBT integration, and customization of the environment to leverage and reinforce company culture through Accenture-branded rooms and realistic looking avatars based on how employees look in real life.

Bob and Bryan worked closely with Victor Penman, a program manager at Forterra, to convert the initial written use case into a prototype learning environment ready for pilot usage with different users. Some interesting components of the Accenture use case included:

- An Accenture-branded training room that had the equivalent feel to actual Accenture training facilities but without the layout constraints of a pre-existing facility.
- Five personalized avatars created from digital photos for key pilot users. Personalized avatars were created for Bob (pictured at right), as well as Bryan, Don Vanthournout — Chief Learning Officer, and Andy White — Director of Capability Development Operations, who were important project stakeholders.



Figure 2: Accenture branded training room.



Figure 3: Bob Gerard's personalized avatar.

- An hour's worth of existing training content was repurposed and delivered in the Accenture room for the pilot users. The presentation content included an MS PowerPoint file, a Computer-based Training module on how to use MS Excel, and sharing a live Excel spreadsheet as an example of application sharing.
- The pilot included four constituent groups — advocates, skeptics, learning executives, and IT, who were brought into the pilot across three sessions. The feedback from all four groups was recorded using the OLIVE record and replay feature which allowed conducting post mortems to sift through what the users liked or didn't like about the experience.

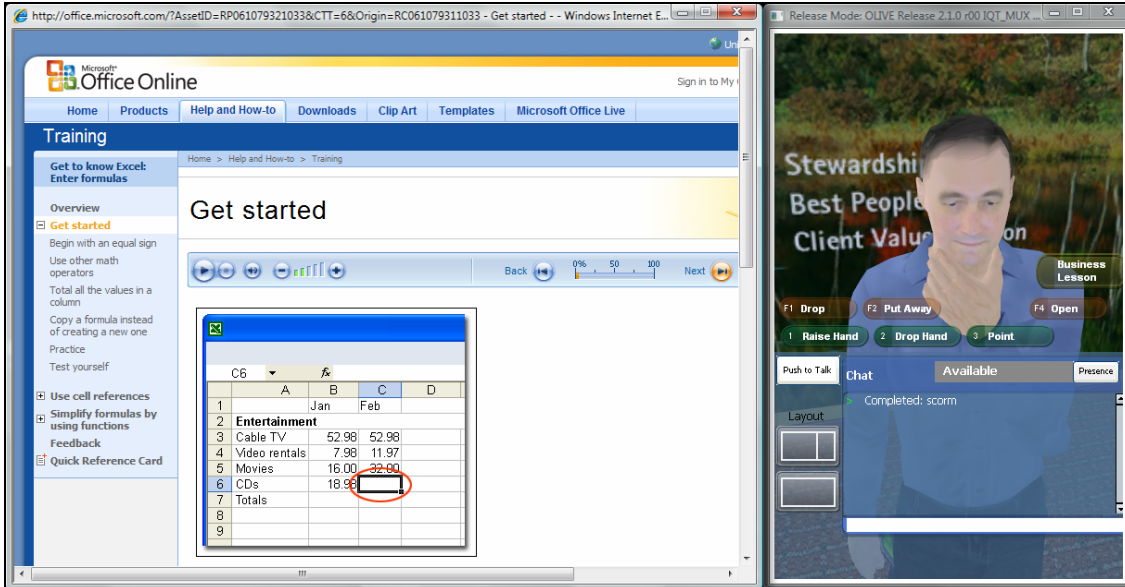


Figure 4: Andy White launching a CBT about MS Excel from OLIVE.

Results

Bryan provided the following comments about their views on participating in the 3D Sandbox:

“Overall, this micro-pilot was a successful method of proving the concept of virtual worlds for business learning. The experience was powerfully engaging for the participants. Several participants commented how this experience was more enjoyable than an audio-based conference call even for just a meeting.

For minimal investment of time and resources, it allowed us to show key sponsors the value of investing in a pilot and the potential uses of the virtual world for learning. The micro-pilot also sparked excitement about many opportunities to leverage a 3D virtual space to address business needs with innovation. The process of planning and implementing the micro-pilot also helped us to think about what enhancements will be necessary or helpful moving forward, such as improvement of application sharing functionality.”

ROI

Bryan commented on their next steps and how they will justify a field deployment through cost savings to Accenture.

“The contending ideas for a follow-up pilot project are largely driven by considerations for cost reduction over how training and meetings are conducted today, and providing more engaging experiences. A virtual world can deliver a more engaging experience than a series of conference calls and will connect learners to each other and build a common, consistent culture at a potentially lower price point. Additionally, there are opportunities to leverage a virtual space for train-the-trainer (faculty preparation activities) that would save on the cost of travel.”

Affiliated Computer Services (ACS)

Company Description

ACS is an outsourcing partner to the world's most complex corporations and governments. As a \$6.2 billion FORTUNE 500 company with 63,000 professionals, ACS supports client operations in more than 100 countries by simplifying their business processes and improving their information technology capabilities. ACS provides innovative solution offerings for Finance & Accounting, Human Capital Management, Information Technology, Payment Services, and Customer Care to clients in Government, Communications, Manufacturing, Retail, Financial Services, Healthcare, Education, and Transportation. Clients partner with ACS because the company is responsive to their business needs, flexible to their changing priorities, reliable for delivering results and acts with integrity at all times.



Figure 5: Media room used by ACS for ILT with accounting client.

Use case

Lyn Maize is a Director within the ACS Learning Services division. She works closely with Caroline Avey, a Learning Strategist, and Patty Stillwell, a Consultant within the division, to ensure they are providing effective guidance to their clients about learning and knowledge advancements. Through their



Figure 6: Meeting participants engage in an interactive group discussion.

Learning Consortium membership, they like to explore the new web 2.0 technologies that are arranged by Elliott Masie. Caroline viewed the 3D Sandbox as an excellent opportunity to test virtual training with one of their big 4 accounting clients who have extensive global training requirements.

According to Caroline, the objectives met through their participation in the 3D Sandbox included:

- Extend industry thought leadership, expertise and a track record in emerging Web 2.0 technologies.
- Provide a sandbox environment for ACS Learning Services staff to experiment with another application of virtual worlds for learning.
- Expedite the creation of an ACS design/development methodology for virtual worlds learning by adapting and refining templates, tools, best practices shared with 3D Learning Collaborative members.

- Showcase ACS 3D learning expertise to learning industry peers, existing and prospective clients.

ACS' goal through the project was to answer questions typically raised by their clients regarding, "Can a virtual space be used to replicate instructor-led learning?" In partnership with their accounting client, they converted non-proprietary portions of the client's course on business consulting to the OLIVE environment in order to evaluate the instructional effectiveness, facilitator and learner acceptance, and technical capabilities of the platform. ACS wanted to test some specific instructional strategies in a virtual world environment:



Figure 7: A small group breakout session is conducted in a separate conference room.

- Live ILT lectures in conjunction with PowerPoint
- Avatar-based role plays
- Asynchronous breakout sessions for team work, collaboration on lesson activities and exercises
- Team presentations
- Classroom discussion, Q&A and interviews
- Live integration of video clips
- Voice integration

Based on the success of the initial pilot, ACS Learning Services will continue exploring with Forterra and the accounting client deeper OLIVE functionality and integration potential. Many of the features mentioned below are provided out-of-the-box with OLIVE. However, ACS is considering how existing learning content used in the live instructor led setting needs to be re-designed or adapted for effective use in a virtual world. ACS will also be considering how to build a collaborative learning environment that is "self-directed" by learning teams. Many of the integrations will have to be pursued based on a deployment behind the accounting client's firewall to ensure IT is comfortable with the security and stability of the learning environment.

- Record and playback of ILT lectures
- On-demand access to archived ILT lectures
- Personalized avatars based on photos
- Meeting scheduling and notification
- Voice integration
- Application sharing
- Whiteboard (flipcharts)
- Searchable user profiles
- Lotus Sametime integration
- Import of stock 3D objects

- File transfer (Participant materials, handouts)
- Integration of client pre-requisite SCORM e-learning modules hosted on the client's LMS
- Polling
- Document repository of client case study tools, templates, participant materials, job aids
- Integration of client-related Flash-based mini-games

Results

The ACS team interviewed their client and their own team members about their pilot experience in the 3D Sandbox. Here are some of the answers provided.

**What is “your vision” for learning in 3D environment?
Where do you see this going?**

“I see this becoming even more of a viable option for training with the advent of the next generation of network speeds and the continued increase in the capability of computers. The graphics will only become better and the world more immersive — and with those changes, an even better fit for distance/remote learning.”

JJ McKenzie (ACS)

“Within my environment, which is a mixture of academic and corporate training, I see it as a platform for conducting real-time assessment in areas such as engineering, management decision-making scenarios, etc.”

Rita Kizito (UNISA)

What was your favorite experience as an avatar?

“I could make my avatar express my thoughts and feelings when appropriate. I could walk up to the person I would like to talk to and it felt like they were actively listening to me.”

Catherine Brumbaugh

What were the key successes from today?

“I think the key success was the demonstration that 3D technology is real and can be applied to learning. A lot of what I’ve seen with Second Life feels very ‘out there’. The application that we saw today was business-oriented and real for people. I also think we learned that it’s easier than we think, that is, use of the technology.”

Phil Penrod

Caroline was particularly pleased with the accomplishments in the Sandbox. She shared the following thoughts:

“The participants were able to interact in ways that are quite similar to ‘real life’ with role playing, assessing an interaction in video, making a presentation, and participating in QA. I learned the importance of not only technology readiness, but making sure the facilitator can give ‘cues’ to help assist using the tool (for example, standing up prior to leaving a room if they are seated), and most significantly, user readiness such as familiarity with a headset. Our biggest issues were with the sound and the microphone features of VoIP since sound is so very dependent upon the setting of the computer and headset. The most amazing fact was that participants ‘stay with the program’ and stay interested instead of ‘multi-tasking’. They have the sense of being engaged, not removed so that it would be acceptable to multi-task.”

ROI

So how do you justify a 3D learning environment for clients? Caroline shared this insight around the potential cost savings for deploying corporate learning in a 3D environment.

“In consulting with clients, we have determined an opportunity for a positive return will be when companies are able to amortize their 3D world development costs and leverage their monthly user costs against travel savings for multiple classes. While a class size design consideration in 3D would be notably smaller with 15 participants and one facilitator, the hard cost of one face-to-face class in the real world could be a minimum \$1,000 per participant for a one-day class. Additionally, there is the soft cost avoidance by minimizing the time participants are away from their work since the travel time and stress is diminished.*

While 3D learning may not completely replicate the effectiveness of a face-to-face experience, companies will be challenged to consider that for some course topics, a slightly reduced effectiveness is worth the savings, risks, and work efficiency gained through deployment of learning in 3D. Our pilot work indicates that while the hard cost savings might be only one consideration for the client business case, there is real value in designing effective learning for this environment (not just replicating face-to-face courseware in 3D world) and that there are opportunities for evaluation and measurement that have yet to be explored.”

**This cost is based upon information received from clients for an average, major U.S. city hotel cost of \$140 per night for a two night stay and an average U.S. airfare of \$510 (non refundable, weekday travel) plus meals, tips, etc for 16 people would be \$15,000.*

Lessons Learned

One of the goals for the 3D Sandbox program was to compile the lessons learned from the efforts of the member companies, Forterra Systems, and The Masie Center. This “recipe for success” would allow learning functions in other organizations to have a clearer path forward on how to leverage virtual world technology for their learners.

What Worked Well?

- Well defined use cases. Ria Christian of The Masie Center and this author created a two-page set of guidelines called “3D Learning: Use Case Suggestions” meant to help steer the members into articulating different dimensions of their desired use case. Putting the use case definition on paper enabled a productive discussion with Forterra experts who could comment on what dimensions of the use case would be easy or difficult to prototype quickly.
- Private, secure, hosted environments. As mentioned earlier there were several member organizations who wanted or needed IT support with the intent of prototyping their 3D environment behind their firewall which is easily supported by OLIVE. However, getting IT support within the few months of the Sandbox duration was challenging for these members.

The other members who made rapid progress all used the Forterra-hosted server cluster that was provided. This cluster was private and secure though it was shared between several member organizations. Accenture purposely engaged IT members to participate in the pilot so they could get familiar with the OLIVE technology. With

the strong ROI case provided in the pilot the learning leaders have been able to gain IT support for a field pilot which is currently being planned as a next step and will involve deploying the OLIVE cluster behind the Accenture firewall.

- Working around corporate firewalls. Some members were able to get their IT staff to open the required ports through their firewall so they could log into the Forterra-hosted cluster from their work PCs. Other members side-stepped this issue by working from a home PC or taking their work laptop home. The IT group at one member company prevented their employees from logging into any external-hosted server so this strategy does not always work. However, the recommendation here is to focus more on the easiest means for key constituent groups to view your prototype. Once leadership and IT have a chance to become comfortable with the prototype it is easier to then gain IT support for the next step. For IT the next step may be opening up firewall ports or supporting the prototype on a server behind the corporate firewall. Forterra will be releasing a network port multiplexer (MUX) feature in the OLIVE 2.2 release in December 2008 that will eliminate many of the IT challenges supporting virtual world communications through a firewall. See the description of this feature under the topic “Working through corporate firewalls” on page 17.
- Branded facilities. Applying the corporate branding, and even building style guides, to 3D meeting environments provides multiple benefits. First, it helps assure senior management that virtual worlds can represent their image and culture in an appropriate way which helps gain trust and confidence in the pilot. Second, the facilities can be designed to be fun without the constraints of real world city ordinances. As highlighted in the Accenture results, a well-designed set of facilities increase the excitement and engagement for users to want to participate in virtual training or meeting events.
- Personalized avatars. The use of realistic looking personalized avatars was cited by the Accenture users as a major contributor to the immersive nature of their pilot. By immersive we mean the perception that I am really in a meeting room, three feet from a colleague whom I am talking and interacting with, even though it’s just their avatar and that colleague is really 5000 miles away. Another benefit of personalized avatars is that the users tend to become emotionally attached to their avatar which comes in handy when used with executives or other major stakeholders being courted in the pilot.
- Minimize the client download size. During the later portion of the 3D Sandbox, Forterra provided a small download installer. The typical OLIVE download package used for demonstrations ranges in size from 250 to 350 MBs combined between the software and 3D content. Downloads this size are painful for users on a home-based DSL or cable modem network connection. The small download package Forterra used at the end of the 3D Sandbox packages only the 3D assets needed for the use case at hand, with the resulting package only being 70 to 90 MBs. In addition to helping with an improved user experience, this package also yielded higher performance of OLIVE on laptops and PCs since fewer 3D objects had to be rendered.
- Plan pilot sessions with different constituent groups. Most any large software deployment requires getting buy in from users, executives, and IT first. Accenture did a good job inviting four different groups (advocates, skeptics, executives, and IT) to

participate and critique the pilot environment. Inviting all these groups into a pilot, and addressing their concerns and issues will ensure consensus of support for a broader field pilot.

- Pre-developed media sharing features. The foundation for success with the Accenture and ACS use cases leveraged media sharing features already released in the OLIVE 2.1 release or that were going through beta testing for the forthcoming 2.2 release. These features include sharing and displaying MS PowerPoint slides, web-based and SCORM/CBT content, desktop applications, and streaming video. OLIVE 2.2 will include white boarding behind company firewalls which will further enhance the breadth of media sharing possibilities.
- 3D voice and audio often better than telephone. Several Accenture users commented that the quality of the audio was better than what they experienced over a conference call, which was a surprise. There are issues getting all users to have headsets and the audio properties tuned before a meeting. However the spatially accurate 3D audio also contributed to the immersive and enjoyable experience.
- 3D recordings yielded marketing content. One of the side benefits of having 3D record and replay built into the OLIVE platform is the ability to create videos and screen shots from the recordings. Every initial group exploring enterprise virtual worlds has to educate, show, and create awareness with potential stakeholders about the possibilities. By nature these are visual applications, so having videos and screen shots help tell the story to audiences who can't participate in a live session.

What Didn't Work So Well?

- Testing the PC, headset, and OLIVE audio properties before an event. The audio experience in OLIVE can be a significant positive contributor towards recreating the experience of a live face-to-face meeting. However one or two participants who didn't take the time to test and tune their PC setup can impair this experience. Users who show up right at the start of the in-world event typically have a hard time following the agenda if they don't take the time beforehand to test their equipment. Forterra recommends scheduling a tuning exercise well before and separate from an in-world event.
- Working through corporate firewalls. Few corporate firewalls have the TCP and UDP ports open that are needed for virtual world users to access a server cluster outside their firewall, or vice versa for external attendees trying to access a server behind the firewall. Many corporations report that requests to IT for opening the needed ports can take weeks.

Forterra is rolling out a "network port multiplexer" (MUX) feature in the OLIVE 2.2 release which will be available late December, 2008. The feature basically routes all the network traffic between the OLIVE client and server through one TCP and one UDP firewall port instead of the wide range of ports historically required. The MUX feature will even allow all client communications to be routed through one TCP port, such as port 80, which is typically open for general Internet traffic. This feature should enable much easier connectivity for OLIVE clients through a corporate firewall to a hosted cluster, possibly without any IT involvement at all if the one TCP and one UDP port have been opened for other reasons.

- Getting IT support. Large-scale deployments will require IT support, so it's important that virtual world advocates eventually get buy in from their IT colleagues. Some company cultures will require IT blessing for any employee to access outside servers, which makes pursuing pilots extremely difficult to start. However, gaining IT backing may be easier after a prototype has been created and piloted when it's easier for executives and IT to see the business benefit by participating in the pilot as Accenture did in their pilot.

Going Forward

One of the common refrains from enterprise users interested in virtual worlds is they aren't sure how to proceed going down a path with their use case. The Recipe for Success methodology shown in Figure 8 breaks down the steps and tracks that Forterra recommends. Here are some specific areas to consider:

- Define your use case. Put on paper your requirements around current processes used, expected benefit using a virtual world, desired scenes, scenarios, number and types of users, and expected results (what learned or discussed) as just a few examples of parameters that must be thought about. Think of a virtual world as a visual, experience-based application so you have to define what the users will see, hear, and experience (external simulations applied to your scenario). Your written requirements will help you work with executives, IT, and outside parties such as Forterra or other consulting organizations who want you to be successful.
- Consider your team members and skills. Very few enterprises have 3D modeling experience but do have lots of web, digital media, instructional design, and software development skills. There are ways to leverage those skills that you do have in your company to tailor and brand your virtual world and still be successful.
- Pursue the crawl-walk-run philosophy. The Recipe for Success methodology is all about prototyping the easiest parts of your use case first so you can quickly achieve success, then iterate to tackle more complex ideas based on your increased competence.
- Get tutorials and training. Forterra's training department offers some comprehensive self-paced tutorials and inexpensive electronically delivered training options around four tracks- Using Interactive Media, 3D Content Creation, Software Development, and Cluster Setup & Management.
- Work together to create the best possible prototype. Typically there are many options using out-of-the-box 3D content, buildings, scenes, gestures, avatars, and features to create a prototype within one to three months achieving 80 to 90% of the desired requirements. Be flexible on how you address your requirements. Also, check with your vendor on their near term roadmap since there are likely some exciting features being released that can help your prototype.
- Test Pilot with Affected Users. Virtual worlds are new so it's best to plan to solicit feedback from your likely users and sponsors: advocates, skeptics, IT, executives.
- Frequent post mortems. Plan to have checkpoints after each major milestone to determine what is working and not working. Because virtual worlds are by nature

visual applications there can be subtle audio, aesthetic, or behavioral issues that will be important to address for getting your users consistently comfortable.

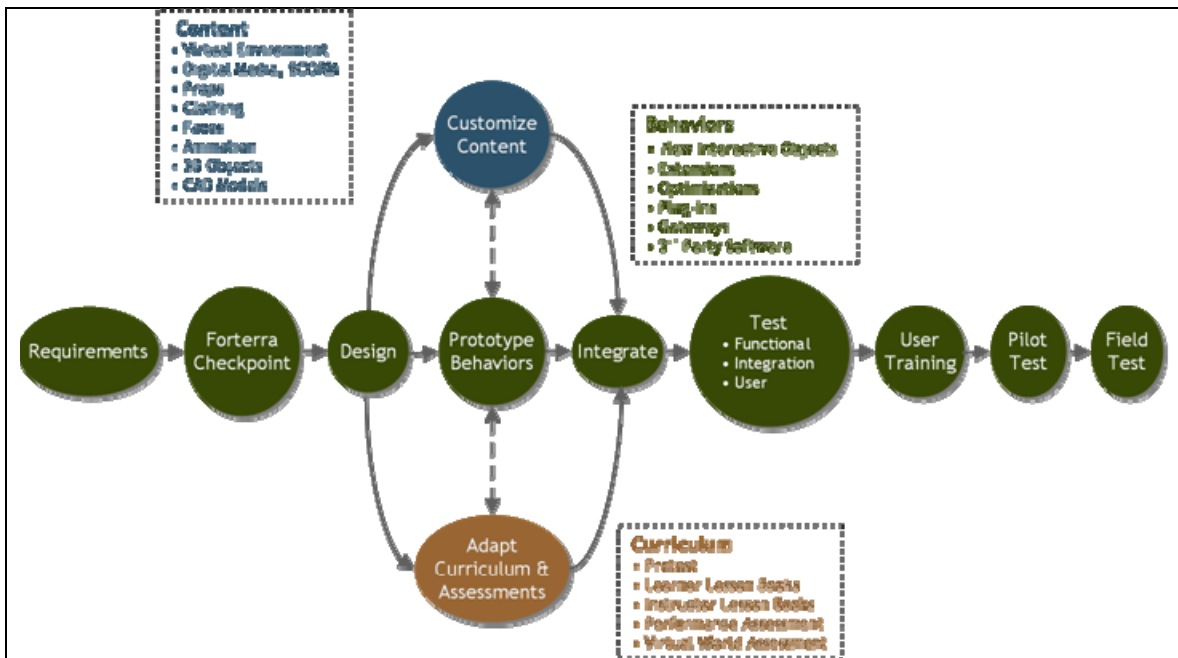


Figure 8: Recipe for Success — Idea to Successful Pilot

For most organizations the promise of virtual worlds is a new adventure – there will be lots of excitement and adrenaline rushes, but the path to success can be littered with potholes if you aren’t careful. Forterra recommends considering a sandbox experience to confirm if your use case can be applied in a virtual world. Forterra offers three developer programs designed to allow you to prototype and pilot your use case quickly through a variety of price points starting at \$10,000. For most enterprises, even some educational institutions, this is a small investment to make given most use cases have compelling and large cost savings at stake. The developer programs include varying levels of training, program management and support to guide you to success. The program manager works closely with you across each of the steps in the Recipe for Success implementation methodology shown in Figure 8.

Pursuing any of the Forterra developer program also gives you access to tools and templates our Studios group has developed over the last six years helping other organizations be successful. The tools include a use case template, a design checklist, an MS Project plan, and a user questionnaire.

The Forterra website at www.forterrainc.com provides lots of collateral, videos, case studies, and white papers to get help you get educated. Inquiries to receive specific information, such as a brochure on the developer programs, or to ask questions can be sent to: <http://www.forterrainc.com/index.php/contact-us> or by clicking the Contact Us link in the right column anywhere on the website.

About the Author

Chris Badger is the VP of Marketing at Forterra Systems with responsibility for all product management, marketing communications, training, and documentation in the company. Prior to joining Forterra Systems, Chris was co-founder and CEO of InsideScoop, an on-demand business intelligence platform which was sold to Harte-Hanks (HHS). His prior company, gForce, provided web-based enterprise knowledge management solutions which captured informal, tacit-based learning. Chris managed North American sales and strategic alliances before the company was sold to SumTotal Systems (SUMT), a global e-Learning market leader. Chris held a variety of product management, alliance and sales management positions at Clarify, an early CRM market leader before the company was sold to Nortel, and with Quantum Corp. He has received an MS in Engineering Management from Stanford University and a BA Engineering Sciences from Dartmouth College.



Figure 9: Chris Badger (left) receiving an award on Forterra's behalf from Erica Driver of ThinkBalm when the Company was named winner of enterprise innovation award by panel of analysts at Virtual World Expo in September 2008.