

CSC



# THE ART OF DISCOVERY

## FOREWORD

# 2008 CSC GRANTS



Discovery — and the ability to track and anticipate new trends, new applications and emerging technologies — is at the heart of CSC's success in providing business value to our clients.

Our clients continually seek out reliable partners who can supply them with sound information on which to base decisions about new technologies and business practices. The Leading Edge Forum's (LEF's) CSC Grants program facilitates this critical market-sensing capability. Through this program, we demonstrate our commitment to leadership and innovation in an array of business areas by encouraging our employees to explore potential breakthrough innovations.

In this way, CSC is able to stay abreast of market-leading business trends, promising new technologies and their application to solving business problems. We share this knowledge companywide, and encourage employees to make original contributions to the body of knowledge in their field. CSC Grants have already paved the way for transformative capabilities and innovative solutions that have blazed new trails, establishing CSC's thought leadership in diverse fields.

The CSC Grants program helps guide organizational decisions by publishing high-quality white papers. We share the grant results with clients through presen-

tations at semi-annual LEF Client Forums and the annual Technology and Business Solutions Conference. Each year, the Leading Edge Forum selects and funds grants from proposals submitted by CSC employees around the world. We invite you to turn the page and discover the breadth and diversity of the work represented in the 2008 grant projects.

A handwritten signature in black ink, appearing to read "Bill Koff".

Bill Koff  
Vice President & Chief Technology Officer  
Office of Innovation, CSC

A handwritten signature in black ink, appearing to read "Paul Gustafson".

Paul Gustafson  
Director, Leading Edge Forum

## ABOUT THE CSC GRANTS PROGRAM

Throughout CSC's history, our people have been known for their ability to see new uses and applications of technology. Our scientists and technologists have often gone beyond their jobs to explore new ideas, developing breakthrough innovations that have changed the company, the discipline as a whole and their own careers.

Recognizing the benefits of "greenfield" research for the marketplace, the individual and the company, the LEF created a formal program in 2000 to build on our culture of innovation by giving employees a structured opportunity to explore a technology topic or solution that is gaining momentum in the market but does not yet have broad exposure within CSC.

Today, in keeping with our broadening focus across technologies and industries worldwide, the CSC Grants program has been expanded to include not only technology applications but innovative business applications that impact organizational decision making.

The LEF provides funds to grant recipients to explore business and technology areas that have strategic implications for market solutions, both near term and long term. By requiring recipients to share their results in a way that can be disseminated throughout the company, we ensure that the Grants program has a deep and wide impact that touches our everyday work for clients worldwide.

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## X3D for Web 2.0 Enterprise Applications

WILLIAM GLASCOE

### About the Grant Recipient



WILLIAM O. GLASCOE IS A PRINCIPAL IN THE FEDERAL CONSULTING PRACTICE MANAGING SEVERAL ECONOMIC REVITALIZATION PROJECTS FOR THE U.S. DOD TASK FORCE FOR

IMPROVING BUSINESS AND STABILITY OPERATIONS IN IRAQ. BEFORE JOINING FCP, HE WAS IN CSC'S DEFENSE DIVISION AS SOFTWARE RISK MANAGER ON A RED TEAM OF THE BEST MANUFACTURING PRACTICES CENTER OF EXCELLENCE IN COLLEGE PARK, MD. WILLIAM IS A CITIZEN-AIRMAN AND SERVES IN THE USAF RESERVES AT THE NATIONAL SECURITY SPACE OFFICE AS A MAJOR AND ENTERPRISE ENGINEERING MANAGER. HE HAS BEEN AN EXPONENT FOR INTEGRATING X3D TECHNOLOGY INTO THE NSSO'S ARCHITECTURE DEVELOPMENT TEAMS. WILLIAM IS AN ALUMNUS OF THE INTERNATIONAL SPACE UNIVERSITY. HE EARNED AN MS IN TELECOMMUNICATIONS FROM THE UNIVERSITY OF COLORADO AT BOULDER AND A BS IN PHYSICS-APPLIED FROM THE U.S. AIR FORCE ACADEMY. HE HAS BEEN A CERTIFIED PROJECT MANAGEMENT PROFESSIONAL SINCE 2002.

Enterprise applications & databases and real-time 3D graphics over the WWW are destined to converge. The extensible 3D graphics specifications are the robust, royalty-free international standards that the Web3D Consortium manages. There is not a single consortium for enterprise application standards, especially royalty free and open.

Looking at the enterprise as governments at all levels, corporations of all sizes and citizens of all ages, the full set of legal entities, this grant explored how X3D graphics standards could support a virtual reality (VR), mirror world, database application to manage all enterprise resources over the life of the enterprise, which could be 100 years or more.

The history of X3D and Web3D Consortium precede a VR system concept that leverages the Internet but focuses on enterprises' computing machinery, software and domain-specific ontological models that manage X3D graphics with artificial intelligence in an object-oriented database of all goods and services acquired during the enterprise's lifetime.

The outcomes were estimates on the X3D data volume and velocity during a century of life for each type of enterprise (human, corporate and government), system modeling language diagrams of the VR system, and a business (Blue Ocean) strategy to take this innovative enterprise resource application and service to uncontested market space.

## Adaptive Techniques Empowering Personalized Marketing for Mobile Devices

JAN-ERIK TÄPP

### About the Grant Recipient



JAN-ERIK TÄPP IS A SOLUTION ARCHITECT WITH CSC IN SWEDEN. HE HAS OVER 25 YEARS OF EXPERIENCE IN IT, COVERING FIELDS RANGING FROM HEAVY INDUSTRY

PROCESS MODELING TO INTEGRATION OF MOBILE DEVICE CAPABILITIES INTO SYSTEMS SERVICING AIRLINE PASSENGERS. JAN-ERIK JOINED CSC IN 2004. HE HOLDS A PH.D. IN THEORETICAL METALLURGY.

The basic goal of any user-adaptive system is to provide users with what they need without their asking for it explicitly. Automatic personalization, therefore, is a central technology used in such systems. On the Web, this typically involves the delivery of dynamic content, such as advertisements and product recommendations, etc., that is tailored to a user's needs.

Automatic personalization involves the creation and maintenance of user profiles with minimal user control. Recommender systems support such functionality. Their use is common in e-commerce Web sites, e.g., to provide customers with product recommendations.

Mobile devices are particularly interesting as targets for recommender systems. Because most device screens are small, advertising space is very limited. The marketing value of showing the right message or product to the right customer must consequently be regarded as being higher in this environment compared to full size browsers.

This grant involves an analysis of the personalization and recommender fields and the development of a working prototype recommender system.

## Minding the Miner — Tracking Miners Using RFID

DAN MUNYAN

### About the Grant Recipient



DAN MUNYAN IS THE CHIEF TECHNOLOGIST AND EVANGELIST FOR CSC'S GSS VISIBILITY SOLUTIONS LAB. HE FOCUSES ON HELPING CLIENTS UNDERSTAND THEIR BUSINESS SAFETY,

SECURITY AND EFFICIENCY CHALLENGES IN TERMS OF VISIBILITY INTO PHYSICAL OPERATIONS, WORKFLOWS AND ERP SYSTEMS. DAN HOLDS THREE INTERNATIONALLY RECOGNIZED SECURITY INDUSTRY CERTIFICATIONS: THE CISSP, CISM AND CISA. HE HAS AN EXTENSIVE BACKGROUND IN CONDUCTING IT PROJECTS OVER 22 YEARS. HE HAS LED OR SUPERVISED THE DEVELOPMENT OF COMMERCIAL HARDWARE AND SOFTWARE SOLUTIONS FOR 12 YEARS. DAN HOLDS AN UNDERGRADUATE DEGREE IN GEOLOGY AND A MASTER'S OF BUSINESS ADMINISTRATION.

The problem of finding trapped underground miners after a roof collapse, flood, fire or explosion presents problems unique to mine owners and safety regulators. In the last 2 years, fatalities in U.S. underground mines have spiked as safety programs have reached the point of diminishing returns relative to the economic incentives of increased production of minerals.

Modern mines require primary and secondary escape routes, extensive safety training, and rescue breathing apparatus for all miners. The challenge today is rescuing trapped miners who have done everything right, without putting additional lives at risk through search and rescue operations.

The study was undertaken to determine if the use of simple, low-cost, commercially available RFID technology uniquely configured around a low-power antenna system could create a trail of intelligent "bread crumbs". The goal of this study is to facilitate rescue operations and limit the area of search and approach from directly above, wherever possible.

Research was completed to determine if current technology was sufficiently flexible to achieve the goal of working without power or direct signal infrastructure, similar to those conditions that would exist during an underground mine catastrophe.

Three approaches were studied to determine whether available technology could be configured to accomplish the goal of locating trapped miners within 50 feet — the stated goal of the MINER Act of 2006. Results from ongoing Mine Safety Administration tests, as well as other examples, were studied to determine the progress toward the goal of "Minding the Miner".

## Radarvision

RICK TOMREDLE

### About the Grant Recipient



RICK TOMREDLE IS PRINCIPAL SCIENTIST AT THE CSC IDENTITY LABS LOCATED IN CAMP HILL, PA. HIS RESPONSIBILITIES ENTAIL STRATEGY AND TECHNOLOGY CONSULTING, SYSTEM

DESIGN AND DEVELOPMENT, AND SERVING AS SUBJECT MATTER EXPERT FOR LOCATION INTELLIGENCE SYSTEMS. HE HOLDS A BACHELOR OF ENGINEERING DEGREE FROM STEVENS INSTITUTE OF TECHNOLOGY AND A MASTER OF SCIENCE DEGREE IN MANAGEMENT FROM THE COLLEGE OF NEW JERSEY. HE IS ALSO A CERTIFIED INFORMATION SYSTEMS SECURITY PROFESSIONAL (CISSP).

There are situations when the need for tracking the movement of humans for safety or security is best done covertly. However, the commercially available technology for such covert tracking is limited.

This study was undertaken to determine if the use of simple, low-cost, commercially available, ultra-wide-band (UWB) ranging radar holds promise as an alternative method to satisfy the need for covert tracking of individuals. UWB was chosen due to its unique characteristics of being able to penetrate nonmetallic materials and to resolve range to within 1 foot of accuracy.

A test was performed in an open laboratory area using two radars placed at right angles to one another. Data was recorded as the subject moved in a 10-foot diameter circle between the two radars. The recorded data was then processed to reveal a calculated track of movement. The results were analyzed to determine if this approach held merit and what modifications might be considered for improvement.

Testing demonstrated that this approach is fundamentally sound. It is capable of effectively tracking the movement of an individual within the parameters of the test environment. The study also found that, although the basic method is affirmed, there are a couple of modifications that should be considered: the use of a Synthetic Aperture Radar approach rather than multilateration and a different antenna design to reduce environmental reflective clutter. It was also discovered that signal processing can be used to obtain finer accuracy than the digitized return data alone.



## Flight Plan Optimization in the Presence of Inadmissible Airspace

VINCENT KUO

### About the Grant Recipient



VINCENT KUO RECEIVED A B.S. DEGREE IN APPLIED MATHEMATICS FROM NATIONAL CHIAO TUNG UNIVERSITY, HSING CHU TAIWAN, IN 1987, AND HIS PH.D. IN AEROSPACE

ENGINEERING FROM UNIVERSITY OF MINNESOTA IN 1999. KUO WORKED AS A STUDENT ENGINEER AT HONEYWELL TECHNOLOGY CENTER BETWEEN 1996 AND 1998, WHERE HE ASSISTED IN IMPROVING THE PERFORMANCE OF THE MISSILE GUIDANCE AND NAVIGATION SYSTEMS.

HE JOINED CSC IN 2001, AND HAS SERVED AS A SENIOR AIR TRAFFIC ANALYST FOR VARIOUS PROJECTS ON TRAFFIC FLOW MANAGEMENT AS WELL AS CONFLICT DETECTION AND RESOLUTION IN AIR TRAFFIC MANAGEMENT. HIS RESEARCH INTERESTS INCLUDE CONFLICT DETECTION AND RESOLUTION IN AIR TRAFFIC MANAGEMENT, TRAJECTORY PREDICTION AND OPTIMIZATION FOR AEROSPACE VEHICLES, AS WELL AS INTELLIGENT MOTION PLANNING FOR AUTONOMOUS AERIAL VEHICLES.

The rising demand for airspace use has caused acute airspace congestion, increased delays and delay-related costs. With the increased congestion, U.S. airlines have intensified their interest, focus and dependence on tailored flight planning that maximizes benefits and mitigates delay based on projected weather, winds, traffic flow constraints, and availability of Special Use Airspace (SUA). Optimizing flight plans to both avoid the bad and benefit from the good in an ever-changing airspace environment is the key to efficient operation in the congested National Airspace System (NAS).

This report presents an optimized flight planning approach for users of the congested NAS. It establishes altitudes, speeds and routes between the departure and arrival airports that:

- Avoid constrained airspace (airspace that cannot be used due to hazardous weather, congestion or activation of SUAs)
- Improve the utilization of the NAS
- Minimize energy (fuel) consumption
- Decrease the congestion-related costs for airlines using the approach

The approach is a discrete search strategy for an optimum flight path based on the established A\* search technique that:

- Breaks the NAS into discrete parts defined by navigational aids (navaids; future iterations of the strategy will use RNAV geospatial points, instead)
- Encloses constrained airspace with convex geometric shapes
- Uses great circle kinematics and specific aircraft dynamics to search for a flight path solution that does not intersect with the boundaries of the constrained airspace geometric shapes
- Yields the minimum fuel consumption (measured by comparing flight duration at constant speed and altitude) between the departure airport and the arrival airport
- Enables in-flight reroute optimization that minimizes the combined flight duration from the departure airport to the current navaid plus the heuristic estimation between the current navaid to the arrival airport

Simulation examples are provided to illustrate the application of the search method that can achieve the wind optimal as well as dynamic FCA avoidance guidance.

## Next-Generation Knowledge Management with Web 2.0

PABLO BERMEJO GARCIA

### About the Grant Recipient



PABLO BERMEJO GARCÍA IS AN IT CONSULTANT FOCUSED ON RESEARCHING BEST-OF-BREED TECHNOLOGIES AND METHODOLOGIES. SPECIALIZED IN

SYSTEMS ARCHITECTURE DESIGN, HIS MAIN ROLE IS AS AN APPLICATION ARCHITECT LEADING A TEAM OF DEVELOPERS IN THE ASTURIAS IT SERVICE CENTER, CSC SPAIN. EXPERIENCED IN BIG PROJECTS FOR GLOBAL ACCOUNTS, PABLO JOINED CSC IN 2003 AND DURING THIS TIME HE HAS BEEN WORKING WITH HIGH PERFORMANCE VIRTUAL TEAMS ACROSS THE GLOBE, PARTICIPATING IN ALL PHASES OF SOFTWARE DEVELOPMENT AND THE PROJECT LIFE CYCLE.

PABLO WON ONE OF THE PRESTIGIOUS LEF TECHNOLOGY GRANT AWARDS IN 2007 WITH HIS WORK "NEXT GENERATION KNOWLEDGE MANAGEMENT WITH WEB 2.0". HIS MOTIVATION HAS CONTINUED TO GROW, FOLLOWING POSITIVE INITIAL REACTIONS TO HIS INVESTIGATIVE WORK, EXPANDING HIS SKILLS SET BEYOND TECHNICAL DISCIPLINES INTO AREAS SUCH AS THE NEXT GENERATION OF COLLABORATIVE ENVIRONMENTS, CORPORATE KNOWLEDGE MANAGEMENT AND ENTERPRISE PORTALS.

Web technologies, far from being using the same resources time and time again and block in a concrete service format, have evolved. They have done so through what today is known as Web 2.0, a brand new concept introduced by O'Reilly Media as a phrase to describe the second generation of Web technologies, mainly focused on on-line collaboration, communication and social networking. Tools like Blogs, Wikis, RSS, Social Bookmarking and Mash-Up applications are now consolidated means inside this emerging scenario, and have a great acceptance within the Internet community.

A new collaboration culture has been conceived, and must truly be embraced by the enterprise in order to improve the current Knowledge Management (KM) Systems. Traditional KM is more about capturing the knowledge through document repositories and share with groupware tools, making it accessible via corporate portals, fragile environments that make users become frustrated.

There is no time to lose: Companies need to mitigate this demise of KM — taking advantage of these emerging technologies, building a new strategy focused on social networks and the flow of knowledge between the people in them. These Web 2.0 tools solve all this by means of sharing, pulling, subscribing and publishing knowledge and above all, connecting knowledge workers, who will be more willing to share their knowledge with others, collaborate and innovate using tools they already know and like. These new enterprise strategies based on Web 2.0 technologies synthesize what today is known as Enterprise Web 2.0.

The main objective of this investigation was firstly to analyze what are the business value, benefits and risks of adopting an Enterprise 2.0 solution for KM, giving a list of recommendations in terms of security, governance, legal regulations and best practices; and secondly, to design a solution of how this Enterprise 2.0 strategy can be embraced by CSC, producing a specific road map for deployment.

## Applications of Advanced Analytics in Mining

JARROD BASSAN

### About the Grant Recipient



JARROD BASSAN IS A CONSULTANT WITH CSC AUSTRALIA, WORKING PRIMARILY WITH THE NATURAL RESOURCES SECTOR. HE HAS OVER 10 YEARS EXPERIENCE IN CONSULTING, AND

THE DEVELOPMENT AND INTEGRATION OF MAJOR INFORMATION MANAGEMENT SYSTEMS FOR THE MINING INDUSTRY. HE HOLDS A BE IN INFORMATION TECHNOLOGY FROM THE UNIVERSITY OF WESTERN AUSTRALIA.

Advanced analytics techniques are used extensively in industries such as aerospace, defence, semi-conductor manufacture and power generation to improve uptime and quality, reduce cost and enable real-time decisions to be made from large data sets that traditionally are too time-consuming to analyse. Leading companies are embracing advanced analytics to gain competitive advantage by making better decisions and are transforming their industries in the process.

Large volumes of data are available in a mining operation from instrumentation on fixed plant (e.g., crushing and beneficiation facilities) and mobile mining equipment (e.g., haul trucks and shovels). Major global mining houses are starting to collect and retain large volumes of process data; but mining operations have not yet realized much benefit from this mass of data. Specific challenges that are facing mining are as follow:

- It is time consuming to analyse large sets of data, so little benefit is realized from real-time analysis and decision making.
- There is a scarcity of skilled engineers available to analyse the data.
- Unprecedented global commodity demand requires everyone to “do more with less.”

This report investigates how advanced analytics techniques can be applied to the mining industry to address the above challenges. Techniques assessed include statistical analysis, predictive modelling, optimisation, modelling of risk, advanced visualization, analysis by experts and automated decision making. These capabilities enable business decision makers, who have limited time and limited statistical background, to make better quality decisions from extensive volumes of data.

What constitutes a “better decision”? For mining, this often translates to improving collaboration across the value chain, considering the impact of decisions on both upstream and downstream processes. The goal is to make decisions that optimise value for the whole organisation, not just the optimisation of unit functions. It is well understood that the ‘interfaces’ between processes in mining are a major source of inefficiency and production opportunity losses. The desire to optimise from ‘mine to mill’ or ‘pit to port’ has been around for many years, but true capability has eluded the mining industry. Application of advanced analytics capabilities in mining will bring together information across the value chain, in real time, to improve operational, tactical and strategic level decisions across the value chain.

In the future, advanced analytical capabilities will be one of the key enablers of network centric operations which will transform the mining industry. Network Centric Operations will be typified by increased levels of business process integration and greater automation throughout the value chain. Early deployments of Remote Operation Centres (ROC) by some mining companies are examples of this trend. Advanced analytical capabilities directly support Network Centric Operations by embedding analytics into automated operational decisions, and by allowing decisions to be optimised for overall business objectives.

## Software-Defined Radio

EDWARD CRISCUOLO

### About the Grant Recipient



EDWARD CRISCUOLO IS A SYSTEMS ENGINEER WITH CSC'S NORTH AMERICAN PUBLIC SECTOR (NPS). ED JOINED CSC IN 1991 AS ONE OF THE PRINCIPAL SOFTWARE DESIGNERS FOR THE USER PLANNING SYSTEM FOR NASA'S TDRSS RELAY SATELLITES. SINCE THAT TIME, HE HAS BEEN THE PROJECT LEAD ON A NUMBER OF SPACECRAFT PROJECTS SPANNING ALL ASPECTS OF THE SPACECRAFT LIFE CYCLE, INCLUDING CONTROL-CENTER COMMAND AND TELEMETRY PROCESSING, SCIENCE DATA PROCESSING AND FLIGHT SOFTWARE SYSTEMS.

SINCE 1999, ED HAS BEEN A KEY MEMBER OF AN APPLIED TECHNOLOGY R&D PROJECT CALLED OMNI, WHICH IS ATTEMPTING TO MIGRATE COMMERCIAL INTERNET TECHNOLOGIES DIRECTLY INTO NASA'S SPACE-BASED APPLICATIONS.

PRIOR TO JOINING CSC, ED WORKED FOR 15 YEARS IN THE DEFENSE INDUSTRY. HE HAS A BS IN ELECTRONIC ENGINEERING AND AN MS IN COMPUTER SCIENCE.

Joe Mitola III, who is often credited as the father of Software Defined Radio (SDR), is quoted as saying, “A software radio is a radio whose channel modulation waveforms are defined in software.” Another widely used but less technical description of unknown origin says simply, “Get the software as close to the antenna as possible.”

An SDR communication system can tune to any frequency band and receive any modulation across a large frequency spectrum by means of software. An SDR performs significant amounts of signal processing in a general-purpose computer, or a reconfigurable piece of digital electronics. The goal of SDR technology is to produce a radio that can receive and transmit virtually any new form of radio protocol just by running new software.

Software radios have significant utility for the military and cell phone services, both of whom must serve a wide variety of changing radio protocols in real time.

Emergency responders also have a critical need for interoperable communications. Someday, this may be achieved by a single, common standard, but SDRs have the potential to do it now with dynamically reconfigurable radios.

The use of SDRs in spacecraft communications has the potential to reduce the cost of groundstation receivers drastically, and to future-proof new flight hardware by providing a system that is easily reusable, reconfigurable and upgradeable without expensive (and sometimes impossible) changeout of flight hardware. It also provides for the exciting possibility of on-orbit modification of the spacecraft's modulation and coding. This option could spell the difference between failure and success for a space mission.

In the long run, proponents of SDR expect it to become the dominant technology in radio communications.

Under this grant, emerging SDR technology was used to develop and document prototype software for an SDR that can receive and demodulate the telemetry stream from an existing spacecraft, such as MidStar-1 or CHIPSat.

## Ubiquitous Web Application Availability

DAVID J. MACLUSKIE

### About the Grant Recipient



DAVID MACLUSKIE IS THE CENTER SCIENTIST FOR CSC'S TRAINING CENTER OF EXCELLENCE. IN HIS 10 YEARS AT CSC HE HAS WORKED ON THE TECHNICAL IMPLEMENTATION OF

TRAINING AND EDUCATION PRODUCTS. HIS LEARNING CONTENT MANAGEMENT APPLICATION, UTOPIA2000, ORIGINALLY CREATED WITH AN LEF GRANT, IS STILL IN USE AND CONTINUES TO EXPAND. THE COLLABORATIVE WRITING AND REVIEW APPLICATION HE CREATED IS CURRENTLY BEING USED BY THE U.S. ARMY FOR THE CREATION OF SYSTEM TRAINING PLANS. DAVID'S CURRENT WORK FOCUSES ON INTEGRATING GAMING TECHNOLOGIES INTO TRAINING SIMULATIONS. DAVID HAS A BS IN PHYSICS AND AN MS IN INFORMATION SECURITY.

The expanding use of rich internet applications (RIAs) continues. Combined with the growth of WiFi connections and a user in a large city can almost have the promised ubiquitous access to information. This idyllic scenario is somewhat dampened by the realities that we face every day. WiFi hotspots are often discontinuous. A simple microwave oven can jam a 802.11b signal, preventing access. Natural disasters like Hurricane Katrina can wipe out all forms of communication over wide areas. Temporary infrastructures can't meet the high bandwidth demand of RIAs, resulting in further bandwidth restrictions. Soldiers deployed in deserts and on or below the oceans have intermittent web access. Even office workers may have temporary but costly outages due to server or router failure, denial of service attacks and power outages.

Adobe has published the Adobe Integrated Runtime (AIR), a multi-OS runtime that "allows developers to leverage their existing Web development skills (Flash, Flex, HTML, Ajax) to build and deploy desktop RIAs." In effect, it allows an offline interface for online applications and allows for auto-sensing of Web-presence and APIs for data synchronization upon regaining network access.

This grant researched the efficacy and limits of AIR to quickly and easily create desktop interfaces of existing Web applications (rich or not), without any alteration to the original Web application. In theory, nearly any Web application can be transformed with current knowledge and technology into a ubiquitous application using a general purpose runtime.

The value of a ubiquitous Web application — one that continues to work without Web access — is that specialized (and expensive) off-line version of critical applications do not need to be created. This significantly lowers the risk of adopting RIAs and other web-based applications and significantly increases the value of existing solutions.

The possibility of utilizing a common cross-platform runtime with only the knowledge of some of the core Web development systems (HTML, Flash) holds great promise. That the system works with existing applications is very exciting! Examples of possible usages include dynamic help systems that currently reside online can be accessed offline, and synchronized ensuring that offline users have the latest content at time of disconnect. Offline content creation can occur for users without network connections due to power failure, lack of Wi-Fi due to car or airline travel, network hardware failure, or environmental isolation (e.g., ships at/under sea, desert environments, and man-made or natural disaster areas).

## Leveraging the Emerging IMS Architecture

RICHARD KACZMAREK

### About the Grant Recipient



RICHARD KACZMAREK IS A SENIOR CONSULTING ENGINEER IN NPS ITIS. IN HIS ROLE AS SERVICES ENGINEERING MANAGER FOR THE GOVERNMENT EMERGENCY

TELECOMMUNICATIONS SERVICE (GETS) PROGRAM, RICHARD IS RESPONSIBLE FOR WORKING WITH TELECOMMUNICATIONS CARRIERS AND VENDORS TO DEFINE IMPLEMENTABLE PRIORITY TELECOMMUNICATIONS SERVICES FOR NATIONAL SECURITY/EMERGENCY PREPAREDNESS (NS/EP) PERSONNEL, USING THE EXISTING PUBLIC TELECOMMUNICATIONS INFRASTRUCTURE. PRIOR TO JOINING CSC, RICHARD WAS A DIRECTOR AT PRICEWATERHOUSECOOPERS, WHERE HE PROVIDED TECHNOLOGY AND MANAGEMENT LEADERSHIP ON A VARIETY OF IT AND TELECOMMUNICATIONS PROJECTS FOR GOVERNMENT AND COMMERCIAL CLIENTS. RICHARD HAS A BS AND MS FROM THE POLYTECHNIC INSTITUTE OF BROOKLYN, AND HAS OVER 35 YEARS OF INDUSTRY EXPERIENCE.

IP Multimedia Subsystem (IMS) — The Long and Winding Road: IMS is an evolving set of telecommunication network standards whose goal is a single enhanced services architecture enabling any telecommunications customer to access any application (service) using any network connection or media. IMS is also designed to achieve faster times to market for enhanced services due to its layered software architecture, based on standards-based application interfaces, and application independence from access details.

Since its introduction in late 2000, IMS has been promoted as a panacea for rapid deployment of enhanced services. Seven years later, the report card on IMS is mixed. On the upside, IMS products exist, interoperability tests and carrier field trials are occurring and the first "full-up" IMS deployments are expected to occur within the next 2 to 5 years. On the downside, there is not one IMS architecture agreed to by all Standards Development Organizations, and an IMS "killer application" has not yet emerged. However, this road is typical for a paradigm shift such as IMS. Going forward, as experience with IMS grows, IMS may still mature to become the preferred approach for development of telecommunications enhanced services.

This report on IMS discusses the following topics:

- What are the business drivers for IMS?
- What are the functional components of IMS?
- Why are there variations to IMS, what are these variations and who is responsible for them?
- What is the extent of IMS deployments?
- Who are the key vendors?



## Trusted Data Centers/Trusted Data Services (TDC/TDS)

RONALD SHERWIN

### About the Grant Recipient



RONALD SHERWIN IS DIRECTOR OF INNOVATION AND TECHNOLOGY PLANNING IN CSC'S IT INFRASTRUCTURE SOLUTIONS DIVISION. HE HAS OVER 40 YEARS

EXPERIENCE IN IT COVERING ALL ASPECTS OF THE NETWORKING AND IP CONVERGENCE ENVIRONMENT. RON WORKED FOR THE DEFENSE INFORMATION SYSTEMS AGENCY (DISA) FOR 17 YEARS AND HAS EXTENSIVE KNOWLEDGE OF THE FEDERAL ENVIRONMENT. HE HOLDS A BACHELOR'S IN ELECTRICAL ENGINEERING AND A MASTER'S IN SYSTEMS ENGINEERING AND IS A GRADUATE OF THE INDUSTRIAL COLLEGE OF THE ARMED FORCES.

How much trust is enough? Beyond the definitive levels of security that exist for national security systems, there is a tremendous information market in both government and industry that uses personal information. Information represents value: The positive is that it characterizes a market of consumers; the negative is that its loss can severely impact the value and reputation of a company. Within the federal government, protection of information has been built around the requirements of FISMA and the guidelines from NIST.

Secure environments cannot be purchased; they are constructed from standards, and legal requirements. An organization's approach to security is an internal policy issue. Control tools are available to assist in managing and protecting an organization's sensitive information. From a federal perspective, providing secure environments to protect information is mandated under FISMA, NIST SP 800-53, and ISO 27001 and 27002. More definitive levels of trust exist through the use of ISO 270001/27002 — which encompass many of the guidelines from the Secure Systems Engineering — Common Maturity Model (SSE-CMM).

CSC has a legacy of providing IT infrastructure solutions and managed services spanning decades of experience. They are also extensively researched, tested and validated in our Centers of Excellence (CoEs) to enhance and expand our offerings to respond to dynamic needs of our public sector clients. CSC became the first business organization worldwide to achieve Level 3 certification against the SSE-CMM model in 1999. The CSC Global Security Solutions (GSS) and the CSC-led Eagle alliance achieved Level 4 status in 2006.

While these efforts were directed toward classified systems, the potential exists to apply these best practices to civil government and commercial engagements, as well as planning for a trusted service offering. Our service delivery approach is guided by ITIL, with a focus on a comprehensive (holistic) solution approach that ties together mission, costs, regulation, strategies, architectures, and services. Our paper provides an integrated approach that incorporates both the mandatory requirements of FISMA and NIST, along with the best practices recommended within ISO 27001/27002 and SSE-CMM.

## Second Life

BEN MACHIN AND DEB O'GRADY

### About the Grant Recipient



BEN MACHIN IS AN APPLICATION ARCHITECT IN CSC'S GLOBAL TRANSFORMATION SOLUTIONS DIVISION. HE HAS BEEN INVOLVED WITH APPLICATION SPECIFICATION, BUILD, DEPLOYMENT AND MANAGEMENT FOR 19 YEARS AND IS A MICROSOFT-CERTIFIED SOLUTION DEVELOPER.

WITH A STRONG INTEREST IN VIRTUAL WORLDS, HE IS AN OFFICIAL SECOND LIFE MENTOR, AND HAS BEEN A RESIDENT THERE FOR OVER 3 YEARS. BEN HAS HAD AN AVATAR IN ONE FORM OR ANOTHER SINCE EARLY PROTOTYPES IN 1999. HE HOLDS A BSC IN INFORMATION TECHNOLOGY.



DEB O'GRADY HAS 27 YEARS EXPERIENCE IN THE HUMAN RESOURCES DEVELOPMENT FIELD. HER FIRST 5 YEARS WERE IN RETAIL, AND SHE HAS BEEN WITH CSC FOR 22 YEARS. DEB HAS HELD VARIOUS ROLES AT THE BUSINESS UNIT AND CORPORATE LEVEL THAT INVOLVED THE DESIGN, DEVELOPMENT, IMPLEMENTATION, AND MANAGEMENT OF LARGE-SCALE LEARNING PROGRAMS AND OR SYSTEMS. HER CURRENT ROLE IS CHIEF LEARNING ARCHITECT FOR THE GLOBAL LEARNING & MANAGEMENT DEVELOPMENT STAFF. DEB HAS AN M.S. IN ADULT EDUCATION/HUMAN RESOURCES DEVELOPMENT.

*"We always ask the question, 'if you knew 20 years ago what you know about the Web today, what would you do differently? The Web took decades. This will likely take half that time."*

*Sandy Kearney, IBM's director of emerging 3-D Internet and virtual business, told Reuters in a Second Life interview.*

Second Life is a virtual 3D environment where the 13 million residents (as they prefer to be known) can interact with each other, go shopping, play games and make a living. But this is not the preserve of teenage gamers: The in-game currency trades against the U.S. dollar, and over \$1.5M is regularly spent 'in game' every day.

Lots of companies are realizing the impact this can have upon training, meetings and customer interaction.

This grant, sponsored by CSC's Corporate Global Learning and Management Development group, is intended to evaluate and select one of many such environments (specifically Qwaq Forums), and establish a proof of concept in the form of a training/collaboration environment. The asset is being designed for sales executives working with C-level client executives supporting CSC's Project Accelerate strategy.

# PAST CSC GRANTS

## 2007

### Emerging SOA Security Technologies, Standards and Challenges for the Federal Sector

Andrew Wilson

### Architecture Blueprint for Leveraging Identity Federation

Søren Thygesen Gjesse

### Distributed Development Solutions

Henry Liang

### An Evaluation of SOA Frameworks

Ramakrishna Raju

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David Lowe

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Enrique Riesgo Canal

### Enterprise Digital Dashboards as Rich Internet Applications

Sidney Shek

### Collaborative Document Review

Geoffrey Grabow

## 2006

### Continuous Warfighter Identification

Daniel Munyan

### Pricing and Revenue Optimization Intelligence

Patricia Marthi

### Creating Targeted Security Environments

Mary Walker

### Multimedia Mining

Doron Shalvi

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Jonathan Gregory

### Ruby on Rails

Marcus Vorwaller

### Infrastructure and the Future Enterprise

Kenneth Betts

### Wi-Max

Carl Wu

### Innovation Frameworks

Pascal Gambardella

## 2005

### DORIAN — Detail-Oriented Rules Identification and Analysis Network

George Marvin

### Mapping the Information Landscape — Topic Map Technology

Paul Lerke

### Open Source Exploitation

John Hancock

### Open Source MySQL Evaluation

Philip Czachorowski

### RFID Security

Peter Rehäußer

### The XQuery Revolution

Progress Mtshali

## 2004

### Adding Meaning to the Web

Edward Luczak

### Applications of Web Mining

Laurence Lock Lee

### Automating High Integrity Security Configuration Management and Control

Aleks Lubiejewski

### Disconnected Wireless Database — Working Outside the Bubble

David Dossett

### Exploring Identity Management

David Lewis

### mCard Concept

Michael Kinder

### Web Acceleration and Network Delivery

David Stringfellow

## 2003

### Embedded Linux as a Mobile Interactive Platform

Robert Donnelly

### Enabling Collaborative Product Design Via Agent Technology

Michael Bauer

### Integrated Reasoning Engine

Robert Hickman

### Reducing the Cost of Software Maintenance Through Self-Healing Software Systems

Jed Higgins

### Using Enterprise JavaBeans in Engineering Environments

James Bosco

### Web Services Security

Michael Mosher

## 2002

### Electronic Currency? Show Me the e-Money

Will Tremain

### LDAPExplorer

Dieter Gerdemann

### Technologies for Personal and Peer-to-Peer Knowledge Management

Eric Tsui

## 2001

### A Thin-Client Distributed Architecture Using XML and SOAP

Rin Saunders

### Bluetooth Wireless Technology

John Johnson

### Digital Pulse Wireless

John Angell

### Encryption Algorithms and Practical Business Application

John Kahanek

### Enterprise Personnel Meta-Directory

William Nunes

### Evaluation of CYC

Roland Sanguino

### Internet Electronic Data Interchange (EDI)

Patricia Humphris

### Investigation of Web-Based Collective Training System Technologies

David MacLuskie

### J2EE Integration Blueprint

Andrew Boyd

### Mass Deployment of Linux in the Enterprise

Robert Romero

### Mixed Initiative Agent-Based Systems

James Skinner

### Practical Application of Distributed Processing

Andi Thomas

## 2000

### BRAINWARE — Artificial Intelligence-Based Search Engine

Jacques Auberson

### Developing Robust Applications Using PHP3

Blake Patterson

### Evaluation of Freeware Development Environment for the Linux Operating System

Kevin Hassett

### Increasing Speed of Development for Windows CE Applications

Rick Nornholm

### Information Dialtone

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### Intelligent Agent Technology Survey

Charisse Sary

### Internet Electronic Data Interchange (EDI)

Felipe Puerto

### IP Version 6: The New Internet Protocol

Claude Doom

### Linux and SAP R/3

Dan McDaniel

### Make WAP Work

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### Network Management Research

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### Object Relational Database Management System (ORDBMS)

Paul Palaniappan

### Real-Time Data Rendering on the Internet

Sheela Belur

### Remote Computing — Mobile Users of VPN and PGP from Standard ISP Services

Tony Reeves

### The Inclusion of Information Portals into an Enterprise Data Warehouse Architecture

Tony Bruno

### Utopia80

David MacLuskie

### Web-Based Customer Care Support and Customer Self-Healing Technologies with Silknet and Motive

Katy Morrison

### Wireless Remote Secure Extranet Access for e-Commerce

Dan Giacomelli





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## About CSC

*The mission of CSC is to be a global leader in providing technology-enabled business solutions and services.*

*With the broadest range of capabilities, CSC offers clients the solutions they need to manage complexity, focus on core businesses, collaborate with partners and clients and improve operations.*

*CSC makes a special point of understanding its clients and provides experts with real-world experience to work with them. CSC is vendor-independent, delivering solutions that best meet each client's unique requirements.*

*For more than 49 years, clients in industries and governments worldwide have trusted CSC with their business process and information systems outsourcing, systems integration and consulting needs.*

*The company trades on the New York Stock Exchange under the symbol "CSC."*

## About the Leading Edge Forum

*As part of CSC's Office of Innovation, the Leading Edge Forum (LEF) is a global community whose programs help participants realize business benefits from the use of advanced IT more rapidly.*

*LEF members work to spot key emerging business and technology trends before others, and identify specific practices for exploiting these trends for business advantage. Members enjoy access to a global network of thought leaders and leading practitioners, and to a powerful body of research and field practices.*

*LEF programs provide CTOs and senior technologists the opportunity to explore the most pressing technology issues, examine proven state-of-the-art practices, and leverage CSC's technology experts, alliance programs and events. LEF programs and reports are intended to provoke conversations in the marketplace about the potential for innovation in applying technology to help advance organizational performance. For more information about LEF programs, visit [www.csc.com/lef](http://www.csc.com/lef).*

*The LEF Executive Programme is a premium, fee-based program that helps CIOs and senior business executives develop into next-generation leaders by using technology for competitive advantage in wholly new ways. Members direct the research agenda, interact with a network of world-class experts, and access topical conferences, study tours, information exchanges and advisory services. For more information about the LEF Executive Programme, visit [lef.csc.com](http://lef.csc.com).*

## About the Artist

TERRY DEVONE WILSON  
"PORTRAIT OF A SPIRIT"

PASTEL AND CONTE CRAYON ON PAPER

DATE: 2007

COLLECTION OF THE ARTIST

SIGNED BY THE ARTIST

CONTACT: TWILSON29@CSC.COM 703.645.0040

THIS PIECE IS PART OF A SERIES CALLED LETTERE D'AMORE, IN WHICH THE ARTIST CAPTURES THE ESSENCE OF A WORD BY DRAWING AND REDRAWING IT, IN A PROCESS HE CALLS "PERSONIFICATION," UNTIL IT REVEALS ITS TRUE EMOTIONAL ESSENCE. IN PORTRAIT OF A SPIRIT, THE WORD SPIRIT SEEMS TO SHOW ITS SOUL.

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