Communication Virtual Machine: Concept, Process, & Design

Novel, Model-Driven Software Technology for Efficiently Delivering Digital Communication Solutions

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Field

- Information Technology
- Digital Communications Solutions
- Model-driven Software

Technology

Digital Communication Information Technology Software

Key Features

- Versatile platform for customized, application-specific software development
- Model-driven approach for providing communication solutions
- On-demand realization of communication services

Key Benefits

- Cost-effective & time-efficient communication software development
- Faster development, ease of use, reusable, and reliable
- Synchronous & Asynchronous communication modes
- Network and Device Independent
- Plug-n-Play & Internet deployable

Stage of Development

Prototype Designed & Implemented; Ready for application-specific field testing within 6 months

Patent Status

Patent pending

Development of Technology for Communications Solutions

Communication is one of the most fundamental functions of business, government, and society at large. Lately, the convergence of data, voice, and multimedia over digital networks coupled with the continuous improvement in network capacity and reliability has enabled a wide range of communication applications such as VoiceIP technology, voice, video, and multimedia conferencing.

Current Strategy

Today's communication tools are developed on an ad-hoc basis with limited separation between application needs and logic, device types, and underlying networks. These complex dependencies on one another result in high costs and lengthy development cycles. Such vertically developed systems typically have fixed functionality and interfaces that do not interoperate with each other due to differences in design, architecture, API, and network/device assumptions. It is difficult to adapt the systems to fit the evolution in user needs, underlying network dynamics, and related hardware technology. Users, particularly sophisticated domain specific users, are forced to hop between tools to satisfy their communication needs. Also, a fragmented development approach poses major challenges in integration and in providing integrated communication solutions. Lastly, it hinders the development of new communication tools, particularly for domain specific applications (e.g., telemedicine), because of the complexity, cost, and lengthy cycle required of vertical development.

An Innovative Strategy: Communication Virtual Machine

The invention of the Communication Virtual Machine (CVM) is a software technology, which includes a new concept, process, and design for conceiving, synthesizing, and delivering digital communication solutions across application domains. In addition, CVM provides a new means of rich multimedia information exchange. This model-driven process can deliver tailor-made applications to fit users' communication needs: 1) a domain expert elicits communication requirements; 2) the expert defines the needs as a model in CVM as a *communication schema*; 3) end users have the option to load and further modify the schema to satisfy their needs; and 4) communication is ready to begin. With this fully-automated, model-driven process, a sophisticated communication model can be built in terms of hours or days, rather than months or years needed for designing and implementing a major communication application. CVM technology eliminates the need for system development in order to fulfill the need of a new communication services or applications – it dramatically reduces the cost and time (from concept to market or time to user). It also provides superior advantage of platform flexibility and adaptivity.

Technology Adaptable to Several Applications

An immediate application of CVM is in telemedicine by supporting healthcare communication and information exchange. Other applications include disaster management, defense communication, banking & financing, and any other industry sector that requires sophisticated communication needs. CVM has a promising application as a general communication tool for enterprises such as universities and middle-to-large-sized companies.

Opportunity

Florida International University is looking for a commercial partner to both further develop and introduce this technology.

Figure 1: Process Flow

Figure 2: Example - Telemedicine

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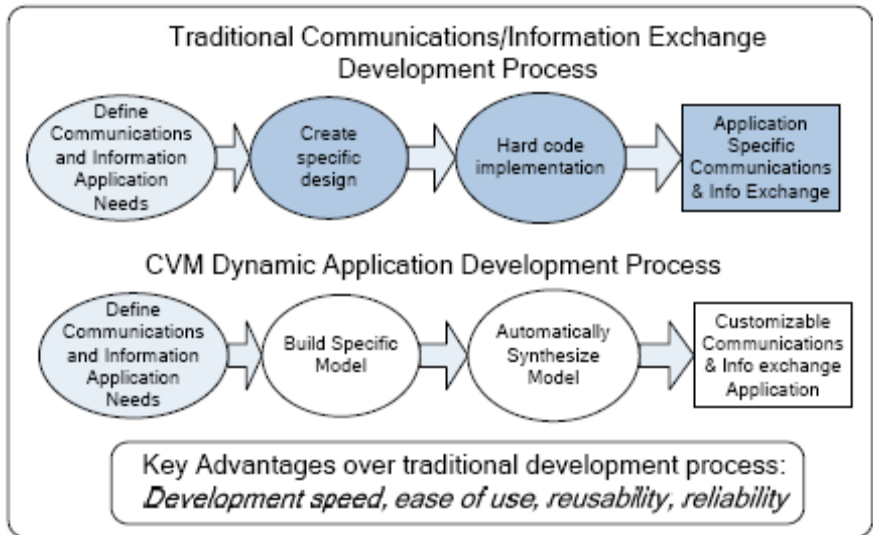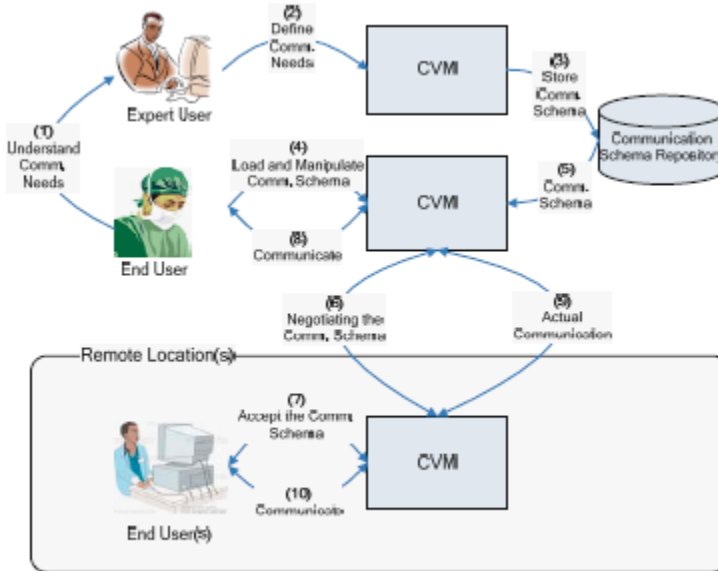*Novel, Model-Driven Software Technology for Efficiently Delivering Digital Communication Solutions*

Inventor: Dr. Yi Deng

Yi Deng received his Ph.D. in Computer Science from the University of Pittsburgh in 1992. He has been the Dean and Professor of School of Computing and Information Sciences at the Florida International University (FIU) – the State University of Florida in Miami and one of the largest urban research universities in the US. Under his leadership, the School has grown into one of the largest computer science and information technology education programs and one of the best externally funded research programs in State of Florida University System, a national leader in diversity, and an active partner to industry. He is an accomplished leader in computing and information technology research, innovation and application. He has authored or co-authored over ninety research papers in peer-reviewed journals and proceedings, and awarded eighteen research grants as the principal or co-principal investigator totaling over $15 million, most of which from premier US federal funding agencies. He has initiated and led many large scale multidisciplinary R&D and education projects and initiatives, founded and directed three research centers, including the Center for Advanced Distributed System Engineering, the NSF Center of Emerging Technologies for Advanced Information Processing and High Confidence Systems, and the IBM Center for Autonomic and Grid Computing at FIU. He has been an active contributor to the professional and research community in various leadership capacities. He cofounded and co-chairs the Board of Governors for the Latin American Grid (LA Grid) Consortium, with members include IBM, Barcelona Supercomputing Center and twelve universities in US, Puerto Rico, Mexico, Spain and Argentina, dedicated for collaborative research, innovation and workforce development in computing.