

TELECOMMUNICATION SERVICE CREATION: A WORK IN PROGRESS



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The road to easy service creation environments in telecommunication has been paved with good intentions. The telecommunications industry has sought to provide easy to use, graphical, and visual service creation environments, complete with interpreters and domain-specific languages for a long time. The Telecommunications Information Networking Architecture (TINA) was an early approach to provide a common architecture on which new services could be built, often by third parties (more about these *third parties* later). The Parlay Consortium was another early adopter that a consistent view of telecommunication services makes it simpler to create new services by third parties. Underscoring the approach to third-party service creation was a set of Application Programming Interfaces (API); a call control API, a conferencing API, and a billing API. The APIs, at this point, hid the complexity of individual vendor switches and business and operational systems (B/OSS). The longevity of TINA and Parlay, however, was limited as the telecommunication domain evolved from circuit switched time division multiplexing to Internet telephony.

In the new world, service creation and service execution were fashioned after the dominant model in the web world: HTTP. Instead of monolithic, multi-layered architectures, lightweight APIs and remote function calls served as the lingua franca. While TINA was not able to find a foothold in this environment, Parlay evolved to Parlay X. The Parlay X APIs use WSDL 1.1 (Web Services Description Language). The aim is to attract as many *web* developers by providing the service infrastructure in a context that they are comfortable with. To that extent, service creation environments have evolved that use general-purpose and popular programming languages like Java and the well-known REST-ful programming APIs prevalent in the

web world. This evolution has culminated in WebRTC, the current exemplar technology that merges the web and the telecommunications world as never before.

Of interest are the third parties toward whom these service creation environments are targeted. The TINA and Parlay experiments considered third parties as mostly telecommunication companies writing services for telecommunication service providers over specific vendor equipment. In today's ecosystem, the over-the-top (OTT) providers are third parties creating telecommunication services. While the OTT providers are still (mostly) large corporations, WebRTC moves the notion of third parties further to allow individual users to create telecommunication services. The move toward the brave new world continues. In our single article in this IEEE Design and Implementation Series, Femminella *et al.* present their work on simplifying multimedia service creation using the Session Initiation Protocol (SIP) and the Media Gateway Control Protocol (MGCP). To ease the complexity of dealing with these protocols in their raw form, the authors propose using Java Call Control (JCC) as an abstraction layer. Their resulting system exhibits performance in terms of reduced code complexity, simplified development effort and faster runtime. While the work of the authors may still be considered too low level — after all, it does require some understanding of call control — it is nonetheless a necessary precursor to the WebRTC model of creating services.

BIOGRAPHIES

VIJAY K. GURBANI [M'98] (vkg@bell-labs.com) is a Distinguished Member of Technical Staff in the Multimedia Domain at Bell Laboratories, Alcatel-Lucent. He holds a B.Sc. in Computer Science with a minor in Mathematics, a M.Sc. in Computer Science, both from Bradley University; and a Ph.D. in Computer Science from Illinois Institute of Technology. His current work

focuses on Internet multimedia session protocols and peer-to-peer (P2P) networks. He is the author of over 50 journal papers and conference proceedings, five books, and 13 Internet Engineering Task Force (IETF) RFCs. He is currently the co-chair of the Application Layer Traffic Optimization (ALTO) Working Group in the IETF, which is designing a protocol to enable efficient communications between peers in a peer-to-peer system. His research interests are multimedia services, multimedia signaling protocols, security of Internet multimedia protocols and services, and P2P networks and their application to various domains. He holds four patents and has nine applications pending with the US Patent Office. He is a senior member of the ACM and a member of the IEEE Computer Society and Usenix.

SALVATORE LORETO [M'01, SM'09] (salvatore.loreto@ieee.org) has 15 years of experience in a variety of information and communication industries, and has been working in networking and telecommunications since 1999. Currently, he works as a research scientist in the MultiMedia Technology section branch, which is part of the NomadicLab, at Ericsson Research Finland. He has made contributions in Internet transport protocols (e.g. TCP, SCTP), signal protocols (e.g. SIP, XMPP), VoIP, IP-telephony convergence, conferencing over IP, 3GPP IP Multimedia Subsystem (IMS), HTTP, and web technologies. He is also an active contributor to the IETF, where he has coauthored several RFCs and Internet drafts. Currently he is serving within the IETF as co-chair of the SIP Overload Control (soc), the Application Area (appsawg) and of the BiDirectional or Server-Initiated HTTP (HyBi) working

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SAVERIO NICCOLINI (saverio.niccolini@neclab.eu) has more than 10 years of experience in information and communication technologies, and has been in the networking and telecommunications industries since 2001. Currently, he leads a research group focusing on the areas of network traffic monitoring, real-time communications and service analytics, and software-defined networking inside the network research division of the NEC Laboratories Europe in Heidelberg, Germany. He has made several contributions to improve technologies for Internet-based service operations and management including, but not limited to, real-time communications monitoring and overload control, streaming analytics of service records and distributed systems for content delivery. He has also been an active contributor to the Internet Engineering Task Force (IETF), where he has coauthored several RFCs and Internet drafts in the operations and management area (e.g., on packet sampling, traceroute measurements and SIP peering). For the IEEE Communications Society, he serves as a Design and Implementation Series co-editor. He received a M.S. degree in telecommunications engineering and a Ph.D. degree in information engineering from University of Pisa in 2001 and 2004, respectively.