Unicat Mobile Service Infrastructure with Prosody X

D-CAT Technologies (D-CAT) is a technology solution provider that operates more like a business partner, developing and hosting applications that take advantage of deployment proven technologies and solutions from global hardware and software vendors such as Aculab and IBM. It has established a high profile reputation serving its mobile telco partners in Turkey by means of its Unicat Mobile Service Infrastructure.

The Unicat Mobile Service Infrastructure is a fully integrated solution that supplies a highly effective platform for managing IVR-based, mobile operator value added services (VAS). It offers flexible content and call centre management, IVR functionality, SMS and MMS messaging, and charging operations.

This case study focuses on D-CAT's Unicat IVR platform, which serves as a call centre application, utilising Aculab's Prosody X DSP boards for SS7-based, mobile VAS, for Unimobil, one of the largest partners of Vodafone Turkey.

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The challenge

D-CAT was approached by Unimobil to build an IVR platform to serve at the core of its IVR-based mobile services. After conducting research into the available packaged software and hardware platform alternatives, D-CAT determined that a suitably flexible solution, inside the borders of the proposed budget for the project, could not be found. Consequently, it decided to develop its own IVR-based solution, by developing with widely available, stable hardware platforms and open APIs.

The key business and technical challenges for the proposed system included ease of development and subsequent deployment, reliability, scalability, real-time reporting needs and, of course, performance and its suitability for use by other mobile carriers. D-CAT wanted to include Unicat IVR as part of its powerful Unicat Mobile Service Infrastructure for mobile VAS in Turkey and elsewhere. Initially for integration with Vodafone's network, for use by Unimobil, Unicat IVR was to become a key part of D-CAT's mobile services platform, enabling it to operate as an application service provider (ASP) for value added IVR/SMS/MMS services throughout Turkey and globally.

The requirements

In essence, a call centre application for mobile services, which would be fully integrated with wireless operator Vodafone Turkey's SS7 network infrastructure, was needed.

An essential criterion for the selection of technology was based on the understanding that the resultant system would have to be continually in operation i.e., 24x7. As even a minor loss of service caused by short downtimes can result in significant loss of revenue, disaster recovery, failover and load balancing mechanisms were also needed.

In addition, scalability was a key factor as the demand for IVR-based mobile services was (and is) continuing to increase in countries like Turkey. There is a high population density in Turkey, where there is also a high level of mobile technology penetration and an IVR market that equates to around 6 million unique callers per month.

Significant requirements existed for performance and operation of the solution. The initial expectation was that the application would have to handle at least three million minutes of incoming speech per month and that this volume would exist from the first day of its deployment. Beyond that early period, call rates were anticipated to rise, practically on a daily basis, as the media investments of business partners – content providers – ramped up.

Further performance criterion resulted from the high rate of direct, SMS-based advertising carried out through mobile services. A messaging load of 240+ simultaneous 'calls' was not going to be unusual and the application would have to handle this load whilst continuing to produce valid reporting data with a low latency. The need for such data was related to the requirement for real-time monitoring and management of content on a per provider basis.

The service platform was designed to be deployed as 'plug and play' and, as a result, readily usable by many additional wireless operators around the world.

Furthermore, as the demand for entering the mobile services business is high and each new mobile originator typically necessitates a different workflow, which is in turn different for each partner that is served as an ASP, adaptability was also a key requirement. This applied to the ease of new service development as well as to situations where changes in the network operator's system were foreseen as being likely.

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The solution

After researching into a variety of hardware platforms with open APIs in order to develop their mobile services platform, D-CAT decided to develop their solution utilising Aculab's Prosody X media processing boards. D-CAT's evaluation of the requirements led it to judge Aculab's enabling technologies critical to its success and went on to launch its Unicat IVR platform with an initial 480-port capacity, based on Prosody X PCI boards and IBM servers.

Also available in PCI Express (PCIe) and Compact (cPCI) formats, Aculab's Prosody X boards deliver the highest density and performance with unmatched call handling and media processing features.

Aculab's API set was considered ideal for D-CAT's needs as it provided a consistent interface across all functionalities from call handling to media processing and the management of both call and DSP resources. Essential functionality for IVR included playback of user menu prompt files, voicemail recording, DTMF detection and echo cancellation. And Aculab's diligent approach to the ongoing development of its APIs meant that D-CAT benefited from a uniform, coherent API for every aspect of its application development.

Furthermore, D-CAT is now a fully accredited member of the Aculab technical support team fan club. Often overlooked or taken for granted in terms of selecting a vendor, support is, however, a key differentiator. The ready access to source code examples, and the friendly advice and guidance readily available from Aculab's pre- and post-sales support teams, was certainly appreciated by D-CAT.

Distributed architecture

To overcome the challenges posed by the critical uptime requirements, D-CAT chose to design its system around the distributed, IP-centric architecture of Prosody X. The core application with its file system controls two boundary defined platforms, designated master and slave. Prosody X boards in both these media server platforms are fully accessible by the application for load sharing, resilience and transparent failover. All call control and media resources in either server operate under application control via the remote API structure.

In terms of scalability, as the core IVR application was designed to communicate with the available boards via the remote resource management API, adding a new board is simple and straightforward. Adding capacity is transparent to the main application and can be done at any time without having to add any new lines of code.

Additionally, as Prosody X is treated as an independent, network controlled device and the main logic of the call control software runs on its board operating system, performance is independent of the Unicat IVR application running on the same server. At launch time, a variety of services, such as astrology and quiz lines, information toll-lines and peer-to-peer chat lines, were being run on the platform and the average number of minutes of speech the system carried was approximately three million minutes of inbound speech and 500,000 minutes of outbound speech traffic. Clearly, Prosody X powered performance was not going to be an issue.

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SS7 software and APIs

Beneficially, for the purpose of creating a generic platform that could be employed by any mobile telco and its ultimate ease of deployment, D-CAT was once more able to gain advantage from Aculab's APIs. As the majority of global wireless operators' networks are based on the ubiquitous SS7 protocol, the fact that the configuration of Aculab's SS7 stack and its integration with the operator's infrastructure is transparent to the main IVR application was a decided advantage.

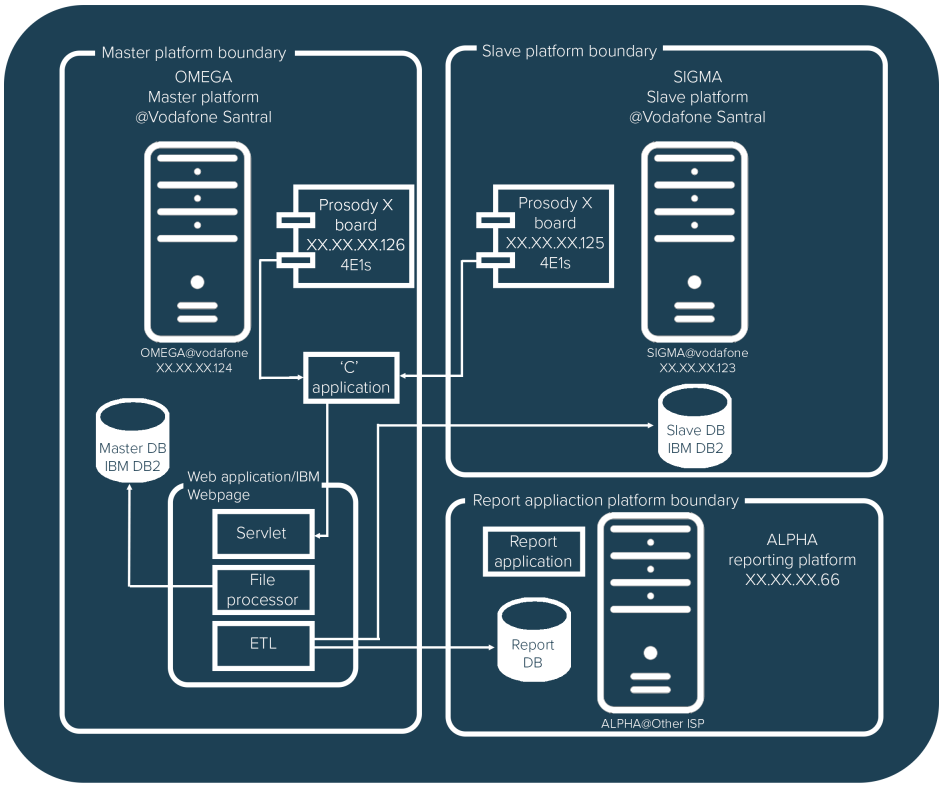
The small footprint of Aculab's software, including its drivers and the SS7 service, had a beneficial effect in relation to the real-time reporting needs. As speech operations are handled on the Prosody X board, incoming and outgoing calls do not consume a great deal of IO or CPU-bound resources on the host server. This leaves ample system resources free to be used by the Unicat IVR processes, including those transferring data to adjacent systems for reporting purposes.

Incidentally, as Prosody X was designed around an IP-core and supports media processing in a native IP environment, together with fully integrated SIP and H.323 stacks, it has given D-CAT future proof migration possibilities as its clients convert their backbone networks to IP-based protocols.

System considerations

A further consideration by D-CAT was in respect of the operating system platform. It decided on running Linux, essentially because of the maximum thread limits inherent in Microsoft's alternatives. Thus, the Unicat IVR is a completely service oriented platform based on IBM DB2 and IBM Websphere products. All other parts of the Unicat IVR system, including the scheduled 'extract-transform-load' (ETL) processes, which load the data produced by the system to the server hosting the database and the reporting web application, were developed using Java Technologies (J2EE), which can be hosted on virtually any platform. Impressively, D-CAT invented its own service description language, which is based on simple state machine logic and this enables it to deploy new service workflows for the platform by simply preparing a service description file and copying it to the server. As a further aid to adaptability, the granularity of Aculab's API enabled D-CAT to develop a real aspect oriented software platform, which consists of completely independent modules. This also simplified the impact analysis of changes in specific parts of the software.

Immediately, the Unicat IVR's adaptable nature was proved indispensable when Turkey changed its systems to include the implementation of number portability. That required changes to the wireless operators' systems, which meant changes in turn to the Unicat platform. It took only one day for D-CAT to implement the necessary adjustment.



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Conclusion

D-CAT's endorsement of Aculab as a key supplier of specialist, DSP-based media processing boards and SS7 signalling protocols is plain.
After a mere eight months of development and test, the Unicat IVR is in full production, integrated and operational within Vodafone Turkey's SS7 network and serving various mobile services, including those of Unimobil.

In an increasingly complicated business environment, strong partnerships are obviously important and the evidence has shown that Aculab invests time and energy into helping its customers develop products that add value and allow their customers to gain a true advantage. It's not just about great technology as that has no meaning without business value. The real benefits come from being able to realise a return on investment.

Commenting on the contribution of Aculab, Ali Yildirim, Managing Partner and Technology Director at D-CAT, said, "Integrating with and building our software on Prosody X with SS7, and getting quality support from Aculab's support team, dramatically increased our efficiency and speeded up the development phase of our IVR platform. Together with Aculab's proven hardware infrastructure, Unicat IVR's easy service description language, robust core service processes and flexible business intelligence platform make it a valuable addition to the telco market."

> *"We are delighted at the success D-CAT has achieved with its Unicat Mobile Service Infrastructure. It is yet another highlight to reinforce the legend of Prosody X. With its distributed architecture and integrated, resilient SS7 stack, it provides tremendous value and delivers both performance and business benefits to solution providers like D-CAT."*

Ian Colville, SS7 Product Manager, Aculab

About Aculab

Aculab is an innovative company that offers deployment proven technology for any telecoms related application. Its enabling technology serves the evolving needs of automated and interactive systems, whether on-premise, data centre hosted, or cloud-based.

Over 1000 customers in more than 80 countries worldwide, including developers, integrators, and solutions and service providers, have adopted Aculab's technology for a wide variety of business critical services and solutions.

Aculab offers development APIs for voice, data, fax and SMS, on hardware, software and cloud-based platforms, giving a choice between capital investment and cost-effective, 'pay as you go' alternatives.

For more information

To learn more about Aculab Cloud and Aculab's extensive telephony solutions visit:

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