Kevin Staunton-Lambert

Video media software engineer (B. Sc Comp Sci)

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EXPERIENCE

Switch Media, Sydney — *Solutions Architect R&D*

OCTOBER 2020 - PRESENT

Streaming video engineer, tackling tough problems around the distribution of ultra high definition encrypted video bitstreams to any player device anywhere in the world. Encoders, packagers & decoders

Production implementation and deployment of media stitching SSAI embedding IAB VAST based ads (HLS/FPS and DASH/CENC)

HbbTV/SmartTV video streaming for Freeview Australia and New Zealand

IPFS peer-to-peer chunked media sharing (4K asset distribution)

Kudelski/Nagra Media/OpenTV, Sydney + San Francisco — *Software Expert, Innovations R&D group*

MARCH 2005 - OCTOBER 2016

Embedded Linux middleware for Asia-Pacific, European and US domestic digital television markets. Broadcom, STMicro broadcast SoCs

Raspberry Pi Linux Device Drivers integration project (Alsa audio and video OMX drivers - DirectFB and EGL/Wayland integrations)

Unity3D video into Android and iOS device (AVFoundation and OpenCV to OpenGL + SDL)

Worked on every Foxtel and Austar set-top-box within 12 year period + some BSkyB UK and Sky Italia set-top boxes also

Cisco/Scientific Atlanta/PowerTV, Cupertino — *Software Eng*

MAY 2001 - AUGUST 2004 (3 years)

Architect and senior lead developer of proprietary set-top-box middleware technology for US domestic, European and Japanese digital television markets

Virgin Media/ntl:, London — *Software Eng*

JUNE 1998 - MAY 2001 (3 years)

A software developer of interactive television and broadband ISP services used by millions of UK subscribers across multiple platforms

SKILLS

LLVM and GNU C/C++ cross compiler multi CPU arch (ARM, MIPS and x86)

Unity3D - OpenGL/OpenMAX

Apple iOS, tvOS, watchOS and macOS and CoreFoundation frameworks and applications (Obj-C and Swift)

Android (TV and mobile) platforms AOSP and Java/Kotlin apps

Python, PHP, golang, Node.js/JavaScript,

Roku/BrightScript

Win32 API and Microsoft.NET and Xamarin/Unity3D (C/C++ and C#)

WindRiver VxWorks RTOS (MIPS32)

OpenCV OpenPose
AWS EC2/S3/Elemental

AWARDS

Certified Scrum Master
Unified Streaming Certified
Registered First Aider
BSCS Honors in Internet tech
[5 Patents granted worldwide](#)

EDUCATION

Huddersfield University, UK — *B.Sc. Comp Sci*

SEPTEMBER 1996 - JUNE 1998 (4-year course)

Graduate of Computer Science (Software Development) BSCS (2.1) with honours awarded for my [dissertation, Interconnecting World Wide Web with Databases (1997/98)](#) demonstrated how multiple tier enterprise technologies were evolving at the time, in particular, the focus was given to ISAPI, ASP and ADO all new technology still under development at this time

My education and skills have been asserted by both the United States government and also the Australian Computer Society (ACS).

PROJECTS

SWITCH MEDIA — Sydney (3½ years)

Foxtel Go - Android AOSP including Google play services integrated set-top-box. Personal efforts included getting Google certification of set-up wraith application, ExoPlayer debugging and assistance with porting (cross-platform) Xamarin based front end streaming application

SBS OnDemand - embedded player with SSAI ad support for Chromecast, iPhone/iPad, AppleTV and Android tablet devices

Freeview New Zealand HbbTV application (runs on every TV on every channel in NZ)

Google Home integration (Ok Google watch Game of Thrones on Chromecast)

OzTAM (Nielsen) lead SDK maintainer - includes tvOS, iOS, Roku (BrightScript), Android, C# and JavaScript variants - this code (which quietly feeds back audience ratings) is deployed in every streaming device in Australia today

Research and production implementation of video and audio stream splitting, transport stream and fragmented MP4 manipulation (real-time live stitching) including low latency HLS TS + fMP4 and DASH fMP4/CMAF

This includes manipulation of FPS encrypted streams (though parallel analysis of equivalent clear HLS stream in a secure location)

Machine-based video quality assurance on 4K streams (C/C++ OpenCV + FFmpeg libav)

Various ad triggering tech (SCTE) also ad replacement (removing existing broadcast ads and stitching in IAB VAST request based targeted ads)

STANDARDS

OTT streaming, Live and VOD HLS/FPS (inc. low latency), DVB/MPEG-DASH, MSS, ULL-CMAF

W3C HTML/XML/CSS (including a WebKit port and WebAssembly, MSE and EME)

DVB Broadcasting, HbbTV 2.0.2 and FreeTV Australia operation standards

Codecs: AV1, AVC H.264, HEVC H.265 (including 4K encoding experience), AAC, Dolby AC3/E-AC3 (Atmos) TV based standards (DSM-CC / HDMI / HDCP / EDID/CCI)

DRM

Microsoft PlayReady 1.0/3.0
Google Widevine
Apple FairPlay
AES-128 DVB CSA / CENC

TEST, DEBUG, PROFILING

GNU GDB/gconf/gprof including Linux kernel debug kdbg

Trace32 MIPS JTAG debugger

XDebug/DBGp/OPCache

Coverity Prevent, ESLint, WireShark, Postman

Git, Perforce, Bamboo, Jenkins, CodeCollaborator, GitHub, Pivotal, LeanKit

Other projects at Switch Media include developing macOS based stream diagnostics app (AVPlayer error logger)

Transport stream manipulation (e.g. rewriting timecode to playback without discontinuity)

IPFS peer-to-peer sharing media files as chunks to reduce demand on public internet when transferring large assets, particularly 4K and longer ultra HD video assets.

VOD2Live on the fly stitching of VOD streaming assets and making them live - mixing in real live events with VOD

Bitmovin (with Amazon AWS) encoders and player integrations

Elemental Live encoders - I helped save the day when Optus infamously [failed in 2018](#) - I maintained the EPL streams into SBS instead. I also configured live encoders for various Free-To-Air live clipping services Switch offers

Have presented my research publicly to technical audiences at conferences and tech meet-ups

NAGRA MEDIA/OPEN TV — Sydney and San Francisco (11½ years)

Owner/Lead engineer for XSI (NDS Extensible SI used by BSkyB/FOXTEL/Sky Italia) middleware component.

Unity3D Video player integration - this would present frame-by-frame onto OpenGL surfaces

OpenCV was also integrated to auto find scene changes and large changes in histograms

Lead design and software implementation of embedded OpenTV middleware clients, controlling companion devices and Nagra broadcast solutions in Australia and the Asia-Pacific region.

This included writing Linux Device Drivers which abstract the OTV5 platform to play video media on a (Broadcom SoC based) Raspberry Pi - this SoC was also used in Roku devices so some experimentation into those devices also

• Executive level presentations of OpenTV5 PVR embedded Linux middleware onto Broadcom 97425 demonstration CATV set-top-box. Implementation of 'XSI' (proprietary event information) SI adaptor to scan and show live television for NewsCorp customers (SkyUK, SkyNZ, SkyItalia and Foxtel)

• WebKit integration to present HTML5/CSS3/JavaScript on Broadcom 97425, involving the integration of Qt4.8 and additional DirectFB integration and performance tuning (including OpenGL ES 2.0 GLES)

• DSM-CC server and client-side test integration.

• SQLite events schedule search and filtering customer demonstrations.

• Design and development to support catch up TV and search services by integrating

OpenTV2 middleware metadata abstraction API with SQLite into existing deployed MIPS32 set-top boxes. (deployment pending)

• Customer CEO presentations of HTTP with cross-origin support to existing OpenTV2 middleware to support HTML5 companion device remote controls for PVR boxes.

Android/iOS controlling Foxtel set-top boxes tuning, playback and search services. (demoware)

• Design and integration of PVR2 solution for Austar. (deployed)

• Design and integration of Terrestrial television support for Austar. (deployed)

• Design and integration of Notify OMM services for FOXTEL. (deployed)

CISCO/SCIENTIFIC ATLANTA/POWER TV — Cupertino (3½ years)

Design and implementation of component-ware support to an existing XML/JavaScript based middleware solution. This work enabled rapid development of all styles of application via an independent modular approach within multiple teams, suppliers and target platform configurations.

The role required continuous full UML lifecycle software design and provisioning with strict adherence to various leading industry standards from such groups as the W3C (XML/Scripting), MPEG (A/V and data standards), ATSC, DVB and ARIB/Japan Cable Labs.

In equivalent .NET terms this 3-year effort was akin to implementing the IUnknown abstract base class, creating a named class registry, supporting referenced based dynamic loading/unloading of modules (DLL), as well as providing multi-threaded UI management to a given device context.

Other supporting code that I built upon this support architecture included:

• Shared object libraries. For example graphics libraries such as JPEG, GIF and PNG, thus saving the developer from the time and effort of incorporating their versions of these common libraries and also

greatly reducing the overall application footprint in the process.

• Multi-threaded animated sprite library providing the customer with the ability to create smooth interactive user interfaces as well as basic Macromedia Flash style games.

• Unicode string pool to support user interfaces for characters in all languages. This class handled pre-allocated blocks of string memory which removes the possibility of physical memory fragmentation which are known performance drags.

Contributions to the actual XML/JavaScript middleware platform code included:

• XML processor look ahead heuristics. Such that the processor can second guess the remainder of a line and groups of similar lines of XML to enable significantly faster parsing and DOM object creation.

• Swappable skin-based user interface wrappers. This allows the end-user to dynamically on the fly change the way the entire application appears to their liking. Similar to XP themes and Avalon use in Microsoft Longhorn platform.

• Development of Japanese IME (Input Method Engine) which involved some understanding of Kana and Kanji dictionaries. (the engine itself was built from both Slangsoft and Agfa libraries IME libraries)

Lead developer of the Japanese on-screen electronic program schedule guide (EPG) currently in the test for a large Japanese MSO for which a patent has since been filed for as me the author.

Microsoft Visual C++ .NET 2003 emulator to allow rapid application development of interactive digital television applications using an ordinary desktop PCs running Microsoft Windows. This project saved countless man-hours of developer time whilst also removing some dependency on the final customer product being available.

Other tools I have helped develop include a WYSIWYG tool to allow graphical content authors to see their handy work on a real television set in real-time from their PC.

Extensive use of UML, Visual C++ .NET 2003, GNU C/C++ and assembler has contributed to my strong object-oriented component-ware development skills and deep understanding and appreciation of the .NET framework currently used in all modern Microsoft operating systems.

NTL: / VIRGIN MEDIA — Westminster London (3 years)

My role included design and development of both client and server-based applications and application components.

I also got to work with Dr Jack Lang, co-founder of the Raspberry Pi Foundation whilst at ntl:

One back-office system that I personally developed was creating an efficient HTTP content re-director which I chose to develop using Microsoft IIS ISAPI filter technology.

The module developed efficiently reformed the data responses (in multiple threads) as they leave the Windows IIS server cluster to support the multitude of simultaneously connected clients.

In this instance, the filter required significant logic and appreciation of the capabilities of each connecting client based on their HTTP referrer due to the issue that the DHTML and user interface restrictions vary considerably between the various supported web browser clients.

Another Microsoft Windows-based solution included the development of a windows desktop information ticker service. This involved creating a shared ActiveX component that in turn used the common .NET WiiInet services to connect to the news feed URL. Using the .NET MSXML processor I then extracted the response data from the call over the Internet.

I also provided an ActiveX container program in the form of a Microsoft Windows shell extension (Win32) enabling the ticker component to be docked in the Windows taskbar or as a floating window component on the users desktop. This project also made its way from ntl: to the BBC and became popular via their news.bbc.co.uk web site.

This project also lead to a minor offshoot cross-platform solution to allow Apple Macintosh and Linux home users to gain access to this service. This I chose to implement at the time via a Java applet embedded in the web page on the ntl: website.

Other duties whilst employed by ntl: included general admin of the ISP services and the MS SQL Server based billing system.

Skills developed included: XML/JavaScript, VxWorks, SQL Server (Transact-SQL), MS WebTV/WinCE, MS IIS/ISAPI, Windows NT Server, TCP/UDP/IP, Sockets, DNS, Perl and Sun OS Solaris UNIX.

TMI / TELECOM ITALIA — City of London (2 years)

(one full year as part of undergraduate course and later part-time contractural whilst an undergraduate)

Development of easy to use project tracking (database) solution between London and Rome.

I also build a digital line utilisation auto reporter which logged into Frame Relay devices and other dial-up and ISDN2 modems and generated usage reports/graphs - this doubled as a very cheap fault reporting tool too when network endpoints didn't respond

Other duties included general local and wide area network user support for Novell Netware 4.11,V.90/X.25/Frame Relay. Basic Cisco, Motorola switches and NewBridge

NetCool admin, Microsoft Access JET, Microsoft Visual Basic and Borland C (MS-DOS) and Borland C++ for Windows

PATENTS (AUTHORED AND GRANTED)

WO 2015013672A2 Measuring response trends in a digital television network

Techniques and systems for providing a trend server outside a content provider network to communicate with the content provider network to build a trend record based on responses received from the content provider network for monitoring

WO 2015/008252 A system for receiving and decrypting multimedia content

A system, method and device for adding security features associated with a hardware-based root of trust to a system for playing encrypted media content. The system allows for traceability of content linked to or derived from a decrypting element.

US 8032908 Graphical indicator within an interactive program guide

HD and 4K TVs have high resolution meaning more content can be shown in things like programme guides, this device makes things easier for the viewer to find content

US 9858337 - Management, categorization, contextualizing and sharing of metadata-based content for media

Recognise media across different mediums, for example, NetFlix, YouTube, DVD, Blu-ray - determine what is being watched, which version of the content is being played perhaps directors cut vs version cut with ad breaks, and determine playback position.

WO 2016/109131 Metadata management for content delivery

Primary media content played on a media device, such as a television, handheld device, smartphone, computer, or other devices, is sampled and data is derived from the sample for identification of the primary media content.

SIDE SKILLS

A keen craft beer brewer - I've been brewing since a student originally for economical reasons and people tell me I'm good at it - so today I manage a nano brewery in Pyrmont. I've been supplying Switch Media with kegs of beer for years

Also into Logic Pro and VSI sound production

Have worked on lighting projects for City Of Sydney's Vivid light and sound festival (The Light Teleportal)

I'm a keen public presenter - I like to describe tricky concepts to wide audiences - happy to share public knowledge but good at filtering confidential parts depending on audience

Some of my public presentations topics (with links to slide decks)

Low Latency media streaming - presented at Sydney International Convention Centre (ICC)

AV1 Video Codec - presented at Sydney Hilton hotel

VOD2Live for Wildfires - presented at Demuxed San Francisco

Raspberry Pi - presented at JayCar Electronics maker hub Central Park

AI TensorFlow for ATR - Google Sydney side presentation

WebAssembly - Sydney Video meet-up

 XDebug Profiling - presented at Deputy Sydney

History of Brewing in Australia - presented to Pyrmont History Group