HardCopy
Building on 34 years of software know how

Visual Studio 2017
All you need to deliver any app on any platform

Cloud Security
Keeping your data secure and legal

Lifecycle Management
How Visual Studio 2017 can help with ALM
Make your ISV business
POWERED BY THE CLOUD

Today, the cloud is making the once ‘impossible’, possible, with developments in business mobility, next-gen security, augmented and virtual reality, the Internet of Things, cognitive systems, robotics, and more.

For an ISV developer, a move to the cloud brings powerful capabilities, innovative technologies, and business enablement that scales.

We want to help you realise your vision and make the most of the growth opportunities that are available with cloud technology.

Quickly build and manage apps and run your applications in the cloud
Distribute your apps at scale
Take advantage of the hybrid cloud

To find out more about Microsoft Azure and get a free 30 day trial, contact Grey Matter on: +44 (0) 1364 655196 and mention HARDCOPY 71, or visit: www.greymatter.com/hc/microsoft-azure

Cloud Accelerate Service • Azure Cloud Help Desk • Cloud Adoption Consultancy • Business Expansion

grey matter
Grey Matter recommends Microsoft Software.
Welcome
Security and privacy are two sides of a coin that has long bugged our society. On the one hand most of us consider that we have a right to a private life, and indeed Article 12 of the Universal Declaration of Human Rights explicitly states that “No-one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honor and reputation.”

The right is implicit in the American Constitution, while Article 8 of the European Convention on Human Rights is more pragmatic in that, though explicitly stated, the right is moderated by the needs of a “democratic society” with regards to national security and crime prevention. Perhaps unsurprisingly, the situation in the UK is less clear, particularly since the fiasco that is the Investigatory Powers Act 2016 (aka the ‘Snooper’s Charter’).

In practice there has always been some give-and-take. We have accepted since the 1920s that our security services can intercept private telephone conversations once they have obtained a warrant, while the police have been able to search a private property on production of a warrant for several centuries now. However, modern technology has upset the apple cart. These days most of us happily sign away our privacy with a single click and a resigned acceptance of the implications.

Some take the attitude that privacy is only of concern if you have something to hide, or go along with Scott McNealy of Sun Microsystems when he said: “You have zero privacy anyway - get over it.” However even they would be reluctant to hand out their credit card details, or their passwords, to all and sundry.

The problem for security services is that accessing the information they are convinced they need is becoming increasingly difficult, which has resulted in ever more persistent calls to legislate for our data to be stored in an accessible form. The problem for us - even for those of us who have nothing to hide - is that such moves can only make our data more vulnerable, and our privacy harder to protect.

Such considerations are particularly relevant to data that is stored in the cloud. If your provider is an American company and your data is stored in a server-farm located in the UK but might be backed up or routed through another in Singapore or Sydney, then access could be subject to the laws of four different countries. And if the ‘Snooper’s Charter’ continues unchanged, then the UK could become the weakest link.

Ultimately the cloud is an international resource, and such matters can only be resolved through international discussion and agreement. Only once that happens can we start thinking about taking back control of our online privacy and identity.

Matt Nicholson, Editor, HardCopy
Microsoft takes up the Slack with Teams chat for Office 365

Microsoft is challenging business chat giant Slack with the launch of Teams, a chat-based collaboration tool for its Office 365 online application suite. As well as Slack-like chat channels, the product features deep integration with Office 365 applications including Skype for Business, and with SharePoint and Active Directory services. It’s supplied as a free add-on for Office 365 Business and Enterprise plans, but won’t be available to Home and Personal users.

Teams presents a Slack-like interface with user-defined ‘Teams’ acting as hubs for multiple Channels (chat rooms) supporting persistent and threaded conversations complete with animated GIFs and emojis. However its tabbed interface also allows users to open other Office 365 apps (including Word, Excel, PowerPoint, PowerBI and the revamped ‘Facebook for Enterprise’ Delve) within chat sessions, with collaborative document editing automatically secured via OneDrive cloud and local SharePoint storage. Skype for Business provides embedded video and voice calls, although Team’s chat connectivity can’t currently extend beyond the host organisation.

Teams is Office 365 Tier C security compliant, with data encrypted in transit and at rest. The system integrates with Microsoft’s Bot Framework, launching with a Slackbot-like ‘T-bot’ helper, plus a forthcoming Whobot, which uses Microsoft’s AI framework and Active Directory to answer questions such as “Who knows about subject x?” A set of more than 70 connectors allow feeds from outside services while Microsoft claims 150 partners for its third-party integration API, including SAP, Asana and Zendesk. Teams can be enabled from the Office 365 admin center, and runs on Windows, Mac, Android, iOS and web platforms.

GrapeCity matches VS launch with ComponentOne release

Pittsburgh-based component vendor GrapeCity has lived up to its status as a Visual Studio 2017 Sim-Ship Partner by shipping its updated, VS2017-compatible ComponentOne Ultimate 2017 v1 suite simultaneously with VS 2017. The bundle encompasses ComponentOne Studio (Windows components) plus Wijmo (JavaScript) and Xuni (mobile) controls, with GrapeCity claiming that it delivers “the fastest and most versatile” components for data management, data visualisation, scheduling, input, editing, navigation and reporting.

The popular InputPanel component, which combines multiple input fields into a single control, is now available in an XAML version, simplifying forms creation across Windows 10 devices. Two new Excel chart types (box-and-whisker plot and ErrorBar) are added to FlexChart for Windows, FinancialChart for Winforms gains MACD and Stochastic indicator series, while the new GanttView for WPF is a complete project management tool with binding to any .NET data source. There’s also a new multi-month CalendarView control, and a new MVC OLAP control complete with C# Pivot Engine.

The Wijmo toolset gains a new TreeView with checkboxes and drag-and-drop support, plus a server-side OLAP control, a PDF Viewer and a new (and apparently unique) MultiAutoComplete control that blends multiple selection with auto completion. GrapeCity is now focusing its Xuni mobile controls on Microsoft’s recently-acquired Xamarin cross-platform toolset, and Ultimate 2017 v1 ships with a beta of ComponentOne Xamarin Enterprise, featuring UWP support, compatibility with Xamarin’s visual designers, and ‘up to twice’ the performance of previous Xuni versions.
Microsoft bundles Redgate tools in VS2017 Enterprise

Redgate • www.greymatter.com/redgate/

As vendors race to sim-ship their Visual Studio 2017 add-ons, Cambridge (UK) tools developer Redgate Software has scored something of a coup by getting its tools included in the VS2017 'box'. Redgate Data Tools, a suite of three items designed to bring DevOps processes to SQL Server and Azure SQL projects, is available as a no-cost standard installation option for VS2017 Enterprise subscribers.

DevOps encourages collaboration between development and operations teams, resulting in quicker feedback and change turnaround, but according to Redgate the unique requirements of database development make them something of a DevOps hurdle. Redgate ReadyRoll Core edition gives precision control over automated change deployment, supporting a hybrid migration/state-based approach suited to frequent change cycles. Features include auto generation of SQL migration scripts with local verification, and integration with VSTS and TFS.

SQL Prompt Core allows developers to write, reformat and refactor SQL code 'effortlessly', with code completion and highlighting, wildcard expansion and INSERT column lists. SQL Search finds SQL fragments in tables, stored procedures and other locations, searches across multiple databases and finds multiple object references. SQL Search is also included in VS2017 Community and Professional editions. ReadyRoll and SQL Prompt are also available in Pro editions with extra features including an Offline Schema Model, stored procedure support and schema drift reports (ReadyRoll).

Intel targets connected car makers with Linus Media SDK

Intel • www.greymatter.com/intel/

Determined as ever not to let ARM dominate the Internet of Things, Intel has launched a new Media SDK for embedded Linux, providing tools and libraries for optimised video processing on its processors running Yocto Project embedded distributions. The package joins Intel Media SDK for Windows, providing a cross-platform, device-independent API for hardware-accelerated video processing. Intel says that the Linux version is aimed at developers working on projects from connected cars to smart cameras, drones and real-time surveillance systems.

The Media SDK API provides an abstraction layer between code and Intel’s QuickSync Video hardware-accelerated codecs, removing the need for device-specific instructions and future-proofing code against hardware developments. Supported video encoders include HEVC, AVC, MPEG-2, MJPEG, and MVC with stereoscopic 3D support, while pre and post-processing support includes deinterlacing/ inverse telecine, resizing, frame rate conversion, and image stabilisation. Fallback provision when no hardware acceleration is available can be automatic or developer-defined. Intel says the API is extensible, allowing the possibility of third-party hardware support.

Intel Media SDK for Embedded Linux supports third and higher generation Core, Celeron, Pentium and Atom processors, and the SDK is currently certified to run on Yocto Project Jethro 2.0.3.

Sketchup sees the light with V-Ray 3 add-on

Trimble • www.greymatter.com/trimble/

‘Trimble’ may not be a household name, but the Californian solutions provider is a worldwide giant, working with industries from construction and agriculture to forensics and forestry. Its Trimble Buildings division produces Sketchup Pro, a high-end 3D design application aimed at architects and planners, and Bulgarian vendor Chaos Group has just released V-Ray 3 for Sketchup, a rendering extension capable of startlingly photorealistic results.

V-Ray 3 uses ‘simulated photon wizardry’ to convert Sketchup models into 2D photographic images, as well as 360 degree stereoscopic exports for VR headsets. The new version emphasises ease of use, with new presets and a Quick Settings dialogue, although the full array of complex settings, best approached with a physics degree, is still there if required.

Also new in V-Ray 3 are a drag-and-drop materials library, quick cutaway and section renders, aerial perspective with realistic depth and haze, automatic noise reduction and ‘realistic grass, fur and carpet’ textures. For seriously big renders there’s V-Ray Swarm, a new distributed rendering system. V-Ray is also available for a range of other design packages, including Katana, Rhino and Revit.

Sketchup Pro, meanwhile, has a new 2017 release with major improvements to its graphics pipeline delivering faster rendering and higher quality transparency. Also new are data tables (with CSV/Excel imports), improved DWG exports with smart scaling, better support for Apple Retina displays and other high DPI monitors, and a new ‘3D for every-cone’ feature which allows people with colour blindness to customise colour schemes.
Enhanced status for Grey Matter
Microsoft has accredited Grey Matter with CSP and SPLA licensing distribution status, alongside its existing ISV Royalty and Bing distribution status. This allows it to offer customers and partners an end-to-end cloud licensing service.

Grey Matter General Manager Matthew Whitton said, “By adding CSP and SPLA distribution status we are able to offer the full range of Microsoft hosting and licensing choices for each customer and partner scenario.”

The SPLA (Service Provider Licensing Agreement) programme allows ISVs and SaaS businesses to host their solutions in their preferred environments, with a monthly subscription model and support from Grey Matter. CSP (Cloud Solution Provider) Indirect allows Grey Matter to provide services to partners offering Microsoft cloud solutions directly to their customers.

Matthew Whitton added, “With all our years of experience working with ISVs in the on-premise arena, we now have the ability to transition ISVs to a hosted solution and provide all the support, services and licensing schemes they will need. Our aim is to be the first choice for all ISVs transitioning to Azure.”

Visual Studio 2017 released
Microsoft's Visual Studio 2017 has been released to general availability. Improvements focus on performance and quick-turnaround DevOps processes, plus cloud and mobile app development. New features include selective install, faster startup, Roaming Extensions, live unit testing and Git integration. Also featured are support for Microsoft’s newly-acquired Xamarin cross-platform. NET implementation, a built-in suite of Azure tools and language updates including enhanced support for C++ 11 and 14. For full details see our VS2017 feature on page 10.

GFI launches OneGuard and OneConnect
Security vendor GFI has launched GFI OneGuard, which combines anti-virus protection, patch management and network resource management behind a single console. Based on GFI’s existing patch management technology, it also includes the Kaspersky antivirus engine. The company has also released GFI OneConnect, an email management solution which runs alongside an Exchange server. The package includes spam and malware filtering backed by two antivirus engines (again including Kaspersky), plus secure cloud-based archiving and a continuity service which provides access to emails and calendars even when the Exchange server is down.

JetBrains updates YouTrack and Upsource
Agile development champion JetBrains has updated its YouTrack issue tracker and Upsource code review and repository browsing tools, both to 2017.1 release. New features in YouTrack include time tracking (find issues which have arisen in a given period), attachments on the agile board, improved user authentication including two-step LDAP, and a revised access tab. Enhancements to Upsource include Cross-project full-text search, improved creation and handling of change reviews, basic Gitlab support and availability as a Docker image. Android Studio compatibility is improved, as are Gradle properties, custom workflows and query assist.

Adobe and Oracle see cloud revenues grow
Media tools giant Adobe achieved record quarterly revenues of $1.68 billion in the first quarter of 2017, with annualised recurring revenue from its Creative Cloud and Document Cloud services reaching $4.25 billion. Oracle also achieved massive online growth, with quarterly revenues from its SaaS and PaaS cloud businesses up 73% to just over £1 billion, and total revenues of $9.2 billion. However Oracle Chairman Larry Ellison says he’s ‘even more excited’ about the company’s Gen2 IaaS offering, which he claims is ‘faster and lower cost’ than Amazon Web Services. Meanwhile security vendor Symantec has launched Symantec Ventures, which will offer cyber security startups capital plus access to Symantec technology and infrastructure.

- Red Hat has released version 3.4 of its OpenShift distribution of the Kubernetes management system for containerised applications. New features include dynamic storage provisioning across on-premises and public clouds, push button deployment for stateful and stateless applications, and enhanced multitenancy via Kubernetes namespaces. The system is compatible with Amazon Web Services, Google Cloud Engine and Microsoft Azure.
- Intel has launched a bug bounty programme, offering up to $30,000 for details of hardware, software and firmware vulnerabilities. McAfee products are excluded, as are recent acquisitions, and payments are on a scale based on CVSS (Common Vulnerability Scoring System) ratings, with a critical hardware bug required for the full $30K. Microsoft has also launched a bug bounty scheme, with payouts of up to $15,000.
- Flexera Software has been named IoT Enablement Company of the Year in the IoT Breakthrough awards, for enabling IoT builders to understand the vulnerabilities and compliance risks of using open source components. Meanwhile Veeam Software has been voted best backup and recovery vendor in a techconsult survey of 2,400 companies across Germany, Austria and Switzerland.
- UK security vendor BeCrypt has pledged its support for the National Cyber Security Centre (NCSC)’s new CyberFirst programme, which aims to improve the UK’s cyber industry by creating opportunities for talented young people. The company will provide financial support, training and work experience opportunities, and help to support residential courses NCSC is running for 14 to 18-year-olds.
Enhance your productivity and teamwork, use Office when and where you need it.

Office 365 is an easy to use and flexible solution that enables you to stay up and running, no matter what happens. Access your projects securely on any device, anywhere, and anytime.

With the new Office 365 Enterprise E5 plan, you can also benefit from:
- Advanced security
- Advanced analytics with Power BI and Delve Analytics
- Cloud-based call management with Skype for Business (includes PSTN conferencing and PBX)

Grey Matter has migrated to Office 365 and our Cloud Services Team can share our experience and provide best practice recommendations for your journey to the cloud.

For a free trial, pricing and to find out more about Office 365, please visit www.greymatter.com/hc/Office365 or call us on +44 (0) 1364 655196 and mention HARDCOPY71.
WIN an Amazon Echo courtesy of Barracuda!

Put your home under voice control! The Amazon Echo will fill your room with music, answer your questions, read you audiobooks, report news, traffic and weather, and even control your lights, switches, thermostats and more once you have fitted compatible devices, all under the command of the Alexa Voice Service. And what’s more, Alexa is continually learning how better to satisfy your needs!

To enter:

Barracuda and Grey Matter would like take a few minutes of your time to find out what you are doing or plan to be doing about cloud security. The survey will take a couple of minutes to complete, and as a thank you for your time your name will go into a draw to win an Amazon Echo.

Complete our online survey and be entered into our prize draw by visiting: greymatter.com/hc/barracuda-survey

TERMS AND CONDITIONS OF ENTRY

1. No purchase necessary for entry to this competition.
2. The prize is one Amazon Echo (colour may vary from that shown above). There is no cash alternative.
3. Completed entries must be received by Friday 23 June 2017.
4. Entries submitted online at www.greymatter.com/hc/barracuda-survey will be accepted.
5. Only one entry will be accepted per person.
6. The winner is chosen at random from completed entries received by the closing date.
7. The winner will be announced on Friday 30 June 2017, and notified by either email or by telephone.
8. The judges’ decision must be accepted as final and no correspondence will be entered into regarding the decision.
9. Employees of organisations connected with this competition are not eligible for entry.
10. Grey Matter reserve the right to use winner’s names in promotional materials.

The competition promoter is Grey Matter Ltd, Prigg Meadow, Ashburton, Devon TQ13 7DF.
Ransomware is the number-one IT security challenge that you face today.

Cybercriminals exploit a variety of threat vectors, including email, network traffic, user behavior, and application traffic to insert ransomware.

Without a comprehensive security strategy that secures all these vectors, you are almost certain to become a victim.

Our analyst research* suggests:
- 47% of businesses have been affected by ransomware
- The FBI reports that $209 million was paid to ransomware criminals in the first quarter of 2016
- 59% of ransomware infections are delivered via email attachments and embedded URLs.

*Research conducted with Osterman Research.

Barracuda provides a complete family of solutions that work together to help you detect, prevent, and recover from ransomware attacks.

Free Barracuda Email Threat Scanner:
Our free online service scans all your Office 365 emails and identifies these dormant threats without any impact on your system’s performance. To date, Email Threat Scanner has found threats in more than 90% of the thousands of mailboxes scanned. And on average, each account was found to contain more than 50 threats.

We invite you to run your free scan right away by clicking this link:

[https://scan.barracuda.com/signup?source=gbsc&ref=information@greymatter.com](https://scan.barracuda.com/signup?source=gbsc&ref=information@greymatter.com)

It takes less than a minute to start, there is no cost to you, and most importantly no performance impact on your environment.

Once your scan is complete, we can review your results together. Depending on your requirements, we can discuss several ways to enhance your security posture and additional tools and strategies to demonstrate compliance.

For more information about the free Barracuda Email Threat Scanner, please don’t hesitate to contact us.

Call Grey Matter on +44 (0)1364 654100 or email maildesk@greymatter.com for more information.
Microsoft's Visual Studio 2017 marks 20 years of Visual Studio, the first being Visual Studio 97 which bundled Visual C++, Visual Basic, Visual FoxPro, Visual J++ and Visual InterDev. It has become a remarkable development tool, not only for its comprehensive support for all Microsoft’s platforms, but also for its ability to target non-Windows operating systems, which goes well beyond previous releases.

Microsoft itself is in transition, with an increasing focus on cloud services such as Office 365 and cloud infrastructure in the form of Azure. Many Azure users run Virtual Machines (VMs) on Linux rather than Windows, and rather than resisting this trend, Microsoft has actively supported it, building partnerships with Linux vendors to improve integration. SQL Server is in the process of being ported to Linux, and the open source fork of .NET, called .NET Core, works on Linux as well as Windows. In the mobile area, Microsoft now has strong support for building cross-platform mobile apps with C# via its Xamarin tools. You can also use Apache Cordova or Visual C++ for iOS and Android.

Visual Studio also retains its traditional role as the primary development tool for the Windows platform. Microsoft has just completed the Windows 10 Creators Update, with new features including 3D and mixed reality support (new VR headsets from the likes of HP, Dell and Lenovo will democratise mixed reality experiences previously reserved for the high-end HoloLens devices); an improved Windows Subsystem for Linux; and better Ink support in UWP (Universal Windows Platform) apps. Visual Studio 2017 along with the updated Windows 10 SDK is the best development tool for Windows 10.

Worth noting is that, despite limited success to date, Microsoft is still pushing for greater adoption of UWP applications. In Windows 10 Creators Update, there is a new option to restrict application installs to Store-only. The idea is that Store applications are more trusted and better behaved, though this can now include Win32/Win64 applications that are wrapped with the Desktop Bridge (formerly known as Project Centennial). If this idea wins adoption, then it pays to develop UWP applications.

UWP applications also have a new feature in Windows 10 Creators Update, which is the ability to display a new view called CompactOverlay mode or Picture in Picture. This is an always-on-top view which is intended to pop up a small status window while your app is running, but the user is working primarily on something else. It is ideal for a chat application, for example.

This release of Visual Studio comes with the final 1.0 release of .NET Core and ASP.NET Core, the culmination of a long process to build a cross-platform version of the .NET Framework. The final release uses MSBuild for building projects, but with a simplified project format that can be edited manually, without unloading the project.

It would now be a mistake to perceive...
Visual Studio as being mainly for .NET or Visual C++ development. Supported languages also include Node.js, Python, R (for statistical applications), JavaScript and TypeScript.

Deploying to containers
Containers are a popular choice in modern development because of their clean deployment model, easy scaling, and suitability for microservices, so it is no surprise to find Visual Studio 2017 having support for containers built in. When you create a new ASP.NET Core project, you can check the box for Docker support, although Docker for Windows does need to be installed separately from the Visual Studio installation. Visual Studio will then build a Docker image based on the YAML files in the docker-compose project that gets added to your solution. By default the Docker container (which is based on a Hyper-V VM) runs Linux rather than Windows, but everything works as you would expect and you can do line-by-line debugging. You can also set Docker to use native Windows containers.

When it comes to deployment, Visual Studio offers several choices. In preview is Azure App Service for Linux, which is an immediate deployment of a single container to Azure’s scalable app platform. Another option is to deploy to an Azure VM. You can also publish to files or to FTP servers for deployment to other platforms.

If you have a more complex solution, you can configure Azure to deploy from a Team Services repository. That way you can set up continuous integration using containers and Azure’s Container Service. At the time of writing this method only supports Linux containers and DCOS orchestration, but support for Kubernetes and for Windows containers is promised.

New editing features
The Visual Studio editor has some handy updates, such as Run to click. While debugging, it is common to want to execute a bit more code, but repeatedly stepping through with F10 or F11 can get tedious, for example if a loop is involved. In previous versions you can right-click and choose Run to cursor; to jump to some code after the loop, but now you can simply hover the mouse over a line of code and click a green arrow once to run to that point.

There is a new Go To All command (Ctrl-T) that lets you search a solution and filter the results by symbols, members, types and more. In addition, Find All References has been redesigned, and now offers grouping, filtering, sorting and searching within results.

A new feature called Structure Guidelines draws horizontal lines connecting each block of code. Hover your mouse over the line and it tells you what the block is, for example showing the namespace, the class and method.

The editor for F# is now based on Roslyn and has many new features, bringing it close to parity with C# and VB.

JavaScript has a new service which supports features new to ECMA Script 2016 as well as JSX, letting you use inline XML-like syntax that gets compiled to JavaScript. Another great JavaScript feature is that you can debug with line-by-line breakpoints in Chrome as well as Microsoft browsers.

XML editing in Visual Studio now supports Edit and Continue within UWP or WPF (Windows Presentation Foundation) applications. There is also smarter IntelliSense, and a Structure Visualizer that shows the context of each block of code without scrolling.

Visual Studio 2017 has a redesigned Exception Helper. This is the dialog that pops up during debugging if you hit an exception. In previous versions there was an Exception Assistant for managed code, and a modal Exception Dialog for unmanaged code. The new Exception Helper will break on the line of code where the exception occurred, even in unmanaged code. Null analysis will determine what is null for a NullReferenceException or Access Violation, where possible. The new dialog is resizeable and can be pinned or floating. It also shows any Inner Exceptions immediately, without having to drill down. It is non-modal even for unmanaged code.

There are also a number of new refactorings for C# and Visual Basic. You can simplify object initialisation with an initialise, which makes member assignments part of the new() statement. You can also add missing cases to a C# switch or VB Select; convert a property to a method or vice versa; make async methods synchronous where possible; convert String.Format to string interpolation (a feature new in C# 6.0); convert null checks to use the null-coalescing operator (a feature new in C# 7); and move ‘out’ declarations inline (using another new C# 7 feature).

Visual Studio’s new installer
The most prominent new feature of Visual Studio is the installer. This is now a separate application and much quicker than previous versions. You can select either workloads, which bundle features together for targets such as desktop development, ASP.NET, UWP, SharePoint or Mobile; or you can select individual components such as specific versions of the .NET Framework, Git for Windows, or the Apache Cordova toolset.

You can also install different editions of Visual Studio side by side, and modify each one from the same installer. An Update button lets you bring previously installed instances up to date with the latest patch.

Businesses rolling out Visual Studio 2017 to a team of developers can create an offline installation for either the full product, or for the subset of workloads that the team needs.

Visual Studio is a highly modular developer tool. Understanding how to install the pieces you need can be confusing, since they might come from the installer, or from NuGet packages, or from Extensions and Updates which are accessed from the Visual Studio tools menu.
Build cross-platform native applications faster with flexible Cloud services and IoT connectivity

RAD Studio 10.2 Tokyo provides developers with:

- Delphi Linux compiler
- Multi-tenancy support for RAD Server
- Code once and reach all stores quicker
- Preview your cross-platform application in real time on multiple devices
- IoT application development
- Improvements to C++, database, FireDAC and FireMonkey

The fastest way to develop cross platform native apps

Find out more about RAD Studio 10.2 by visiting greymatter.com/hc/Embarcadero or call one of our Embarcadero specialists on +44 (0) 1364 655123.
Targeting mobile devices

Xamarin for Visual Studio, Microsoft’s toolset for compiling for iOS and Android using C#, is now at version 4.3 and fully integrated with the new Visual Studio installer.

Since Microsoft’s acquisition of Xamarin in early 2016, the tools have continued their energetic development. Newer platforms such as Apple Watch, tvOS and Android Wear are supported; Visual Studio for Mac has been launched, and many bugs have been squashed. In February 2017, Microsoft said it had fixed 1,800 bugs in Xamarin Forms, the cross-platform version of XAML optionally used by Xamarin mobile applications. Compiled XAML is said to be five times faster than previously on iOS and Android. Xamarin Forms now supports Windows 10 UWP as well as mobile and there is also news that Xamarin Forms for the Mac will come later in 2017.

Xamarin Forms is less flexible than designing a custom user interface for each platform, but it is important to note that native platform widgets are still used, so it does retain the correct look and feel.

Most mobile applications are part of a larger project involving cloud-hosted services. In Visual Studio 2017, a new template called Cross-Platform App creates an end-to-end application with a backend service hosted in Azure and clients for Android, iOS and Windows 10 (UWP). The wizard prompts you to select an Azure subscription as well as giving options for additional services such as a SQL Server database. Once created, you can add further services including Application Insights for monitoring, Azure Storage, Office 365 and Azure Active Directory authentication.

The resulting solution has separate projects for iOS, Android and Windows, so you can decide whether code is shared by all the projects, or specific to a particular platform. The backend service is an ASP.NET MVC application, and the project supports two special controller types, Azure Mobile Apps Custom Controller and Azure Mobile Apps Table Controller, for connecting to data via the Entity Framework, or connecting to your custom Web API.

Building bots

Microsoft has invested in cloud services for machine learning and artificial intelligence, in the belief that this will be increasingly important. Cognitive Services is a set of currently 24 APIs divided into five categories:
- Vision: APIs for image recognition and content moderation. For example, you can upload an image and parse its content, and even recognise people in your organisation.
- Speech: convert text to speech or speech to text, and recognise who is speaking.
- Language: includes services for checking spelling, translating and analysing text.
- Knowledge: make personalised product recommendations, analyse academic papers, search structured data.
- Search: use Bing to search the internet for news, images, video or general web content.

Although these APIs are relatively new, and in some cases still in preview, they do a good job of democratising features that would previously have been out of reach for most developers. The Bot Framework supports SMS, so this could work hands-free while the employee is driving, assuming the phone has the ability to send texts via speech.

Microsoft has templates for bot applications and a NuGet package called Microsoft.Bot.Builder which you can add to your application. The essence of the Bot Framework is the ability to code dialogs, with the Framework providing a Context object for your dialog methods so you can review an earlier conversation and respond appropriately. You can use the Framework with an ASP.NET Web API application, so it should be familiar if you have worked at all with ASP.NET MVC.

Before firing up Visual Studio though, you probably want to create a LUIS (Language Understanding Intelligent Services) application so that your bot can interpret messages. A LUIS application is a cloud service customised to your needs. You create them by logging in at http://luis.ai. Once created, LUIS applications are composed of Intents, which represent actions or verbs, and Entities, which represent subjects and objects.

A LUIS application has to be deployed, and there is a built-in process for deploying to Azure. A limited number of interactions are free, making it easy to build demos and prototypes. Once you have set up LUIS, you can return to Visual Studio. Microsoft has templates for sending input to LUIS and creating dialogs based on its results. For example, you can create a CheckStock dialog that will be called

Using LUIS to add utterances that will enable it to parse text input.

Microsoft has templates for bot applications and a NuGet package called Microsoft.Bot.Builder which you can add to your application. The essence of the Bot Framework is the ability to code dialogs, with the Framework providing a Context object for your dialog methods so you can review an earlier conversation and respond appropriately. You can use the Framework with an ASP.NET Web API application, so it should be familiar if you have worked at all with ASP.NET MVC.

Before firing up Visual Studio though, you probably want to create a LUIS (Language Understanding Intelligent Services) application so that your bot can interpret messages. A LUIS application is a cloud service customised to your needs. You create them by logging in at http://luis.ai. Once created, LUIS applications are composed of Intents, which represent actions or verbs, and Entities, which represent subjects and objects.

Imagine that you are creating an application that allows employees to check the price and stock of products while on the road. The Bot Framework supports SMS, so this could work hands-free while the employee is driving, assuming the phone has the ability to send texts via speech.

In the LUIS application therefore you might create Intents called CheckStock and CheckPrice, and an Entity called Product. Next you would add example statements, called Utterances, and show LUIS how to parse them. For example, the utterance “How many widgets are in stock?” is an example of the CheckStock intent and contains a Product entity.

A LUIS application has to be deployed, and there is a built-in process for deploying to Azure. A limited number of interactions are free, making it easy to build demos and prototypes. Once you have set up LUIS, you can return to Visual Studio. Microsoft has templates for sending input to LUIS and creating dialogs based on its results. For example, you can create a CheckStock dialog that will be called

Using LUIS to add utterances that will enable it to parse text input.

Microsoft has templates for bot applications and a NuGet package called Microsoft.Bot.Builder which you can add to your application. The essence of the Bot Framework is the ability to code dialogs, with the Framework providing a Context object for your dialog methods so you can review an earlier conversation and respond appropriately. You can use the Framework with an ASP.NET Web API application, so it should be familiar if you have worked at all with ASP.NET MVC.

Before firing up Visual Studio though, you probably want to create a LUIS (Language Understanding Intelligent Services) application so that your bot can interpret messages. A LUIS application is a cloud service customised to your needs. You create them by logging in at http://luis.ai. Once created, LUIS applications are composed of Intents, which represent actions or verbs, and Entities, which represent subjects and objects.

Imagine that you are creating an application that allows employees to check the price and stock of products while on the road. The Bot Framework supports SMS, so this could work hands-free while the employee is driving, assuming the phone has the ability to send texts via speech.

In the LUIS application therefore you might create Intents called CheckStock and CheckPrice, and an Entity called Product. Next you would add example statements, called Utterances, and show LUIS how to parse them. For example, the utterance “How many widgets are in stock?” is an example of the CheckStock intent and contains a Product entity.

A LUIS application has to be deployed, and there is a built-in process for deploying to Azure. A limited number of interactions are free, making it easy to build demos and prototypes. Once you have set up LUIS, you can return to Visual Studio. Microsoft has templates for sending input to LUIS and creating dialogs based on its results. For example, you can create a CheckStock dialog that will be called

Using LUIS to add utterances that will enable it to parse text input.

Microsoft has templates for bot applications and a NuGet package called Microsoft.Bot.Builder which you can add to your application. The essence of the Bot Framework is the ability to code dialogs, with the Framework providing a Context object for your dialog methods so you can review an earlier conversation and respond appropriately. You can use the Framework with an ASP.NET Web API application, so it should be familiar if you have worked at all with ASP.NET MVC.

Before firing up Visual Studio though, you probably want to create a LUIS (Language Understanding Intelligent Services) application so that your bot can interpret messages. A LUIS application is a cloud service customised to your needs. You create them by logging in at http://luis.ai. Once created, LUIS applications are composed of Intents, which represent actions or verbs, and Entities, which represent subjects and objects.

Imagine that you are creating an application that allows employees to check the price and stock of products while on the road. The Bot Framework supports SMS, so this could work hands-free while the employee is driving, assuming the phone has the ability to send texts via speech.

In the LUIS application therefore you might create Intents called CheckStock and CheckPrice, and an Entity called Product. Next you would add example statements, called Utterances, and show LUIS how to parse them. For example, the utterance “How many widgets are in stock?” is an example of the CheckStock intent and contains a Product entity.

A LUIS application has to be deployed, and there is a built-in process for deploying to Azure. A limited number of interactions are free, making it easy to build demos and prototypes. Once you have set up LUIS, you can return to Visual Studio. Microsoft has templates for sending input to LUIS and creating dialogs based on its results. For example, you can create a CheckStock dialog that will be called

Using LUIS to add utterances that will enable it to parse text input.

Microsoft has templates for bot applications and a NuGet package called Microsoft.Bot.Builder which you can add to your application. The essence of the Bot Framework is the ability to code dialogs, with the Framework providing a Context object for your dialog methods so you can review an earlier conversation and respond appropriately. You can use the Framework with an ASP.NET Web API application, so it should be familiar if you have worked at all with ASP.NET MVC.

Before firing up Visual Studio though, you probably want to create a LUIS (Language Understanding Intelligent Services) application so that your bot can interpret messages. A LUIS application is a cloud service customised to your needs. You create them by logging in at http://luis.ai. Once created, LUIS applications are composed of Intents, which represent actions or verbs, and Entities, which represent subjects and objects.

Imagine that you are creating an application that allows employees to check the price and stock of products while on the road. The Bot Framework supports SMS, so this could work hands-free while the employee is driving, assuming the phone has the ability to send texts via speech.

In the LUIS application therefore you might create Intents called CheckStock and CheckPrice, and an Entity called Product. Next you would add example statements, called Utterances, and show LUIS how to parse them. For example, the utterance “How many widgets are in stock?” is an example of the CheckStock intent and contains a Product entity.

A LUIS application has to be deployed, and there is a built-in process for deploying to Azure. A limited number of interactions are free, making it easy to build demos and prototypes. Once you have set up LUIS, you can return to Visual Studio. Microsoft has templates for sending input to LUIS and creating dialogs based on its results. For example, you can create a CheckStock dialog that will be called

Using LUIS to add utterances that will enable it to parse text input.
Live Unit Testing

A powerful feature in Visual Studio 2017, though reserved for the Enterprise edition, is Live Unit Testing. Note that there are several additional requirements for this to work. Your project must use C# or Visual Basic and target the .NET Framework, not .NET Core. You must also use a supported Test Framework. In the case of Microsoft Test, you have to remove the default Microsoft.VisualStudio.TestTools.UnitTesting. UnitTestFramework and install the latest version of MSTest. TestFramework using NuGet. Finally, you have to ensure that the MSTest.TestAdapter package is added to the project.

With Live Unit Testing enabled, icons in the left margin show the test status of your code as you work. Whenever you start Live Unit Testing from the Test menu, some magic happens. As you edit your code, a tick shows for code that passes tests, a cross for failures, and a blue horizontal bar for code that is not covered by any test. The tests do not execute immediately. Whenever a test is added to the mix, if accuracy is critical, your application will probably need to verify actions with the user, using phrases such as, “I am going to order 500 of the widget product for customer X, is that correct?”

When this is all done, and you start Live Unit Testing from the Test menu, some magic happens. As you edit your code, a tick shows for code that passes tests, a cross for failures, and a blue horizontal bar for code that is not covered by any test. The tests do not execute immediately, but in the interim a small wait icon shows that re-test is pending.

With Live Unit Testing enabled, icons in the left margin show the test status of your code as you work.

Licensing Visual Studio 2017

This is a complex subject and it’s worth speaking to a reseller such as Grey Matter to find out which is best for you. Visual Studio comes in a number of different editions. Visual Studio Professional is fully licensed for commercial use and includes Team Foundation Server (TFS) and Team Services support, though the standalone license does not include a TFS CAL (Client Access Licence). Visual Studio Professional with MSDN includes a full commercial IDE licence, as well as access to Windows Desktop, Windows Server, SQL Server, Azure credits for testing and development, and a TFS CAL. Visual Studio Enterprise with MSDN adds comprehensive test support. You also get the Redgate Data Tools, architecture diagrams and lab management support, together with Xamarin Profiling and Test Recorder. Each Enterprise licence comes with a Concurrent Pipeline licence for TFS, enabling multiple simultaneous builds and parallel build agents, together with access to over 11 terabytes of Microsoft software.

Visual Studio Test Professional with MSDN is not designed for development, but gives full support for test case management, lab management and TFS testing and reporting. Visual Studio Community is free and relatively full featured, though there are some features missing including TFS integration and built-in version control. There are limitations to using this edition in a production environment.

Subscription options

Most Visual Studio licences come as subscriptions, though you can purchase Visual Studio Professional as a standalone licence.

Standard Licence: Visual Studio Professional only, no TFS CAL included.

Standard Subscription (formerly MSDN subscription): The Visual Studio Professional version includes a TFS CAL, Azure credits, and access to products such as Windows Server, SQL Server and Windows. The Enterprise version adds Office and more options for testing and development. Your Visual Studio licence does not expire with the subscription.

MSDN Platforms: Available exclusively through volume licensing, this does not include the Visual Studio IDE. Rather, it offers a full range of Microsoft products such as Windows Server, SQL Server, Windows and Office for development and testing. $100 of Azure credits per month, use of Visual Studio Team Services, and a licence for Team Foundation Server with one CAL.

Cloud Subscription: For either Visual Studio Professional or Enterprise, including a TFS CAL. Available on a monthly or yearly basis, although access to Microsoft platform software and Azure credits only applies to annual subscriptions. Your Visual Studio licence does expire with the subscription.

What’s new in C# 7 and Visual Basic 15

The C# and VB languages have both been updated for Visual Studio 2017.

- Value tuples let you return more than one value from a function. In order to use them, you need to add the Nuget package System.ValueTuple to your project.
- You can now return values from functions by reference, a feature called ref returns.
- Async methods return types are no longer restricted to Task or Task<T>, though return types may have follow certain rules and have a [TaskLike] attribute.
- Nested local functions (C# only) let you declare functions within a block. Delphi (Object Pascal) developers will recall being able to do this years back. Functions nested within other functions are private to the parent function and have access to local variables within that function. This can enable cleaner code, avoiding passing multiple arguments or declaring utility functions, especially in recursive processing.
- Pattern matching expressions (C# only) extend the “is” operator to test expressions against patterns, a feature common in functional languages.
- Binary literals let you define binary numbers using a prefix (0b in C#, &B in VB). You can use the underscore character as a separator for readability, with no semantic value.

Find out more

You can get a detailed comparison of each edition of Visual Studio 2017 at [www.visualstudio.com/vs/compare/](http://www.visualstudio.com/vs/compare/). For more information see the Grey Matter website at [www.greymatter.com](http://www.greymatter.com). You can also call us on 01364 654100 or email maildesk@greymatter.com.
Tap into the Power of Parallel

Reach new heights on the fastest Intel® Xeon® and Intel® Xeon Phi™ processors and coprocessors with new standards-driven compilers, award-winning libraries, and innovative analyzers.

Create faster code—faster.

Intel® Parallel Studio XE
Get it now: greymatter.com/hc/ipsxe-2017
Or call: +44 (0) 1364 654100

For more complete information about compiler optimizations, see our Optimization Notice at software.intel.com/en-us/articles/optimization-notice#opt-en. © 2017 Intel Corporation. All rights reserved. Intel, the Intel logo, Intel Inside, the Intel Inside logo, Xeon, and Intel Xeon Phi are trademarks of Intel Corporation in the U.S. and/or other countries. Other names and brands may be claimed as the property of others.
Whether you’re a small business or a multi-national organisation, we all know how exciting, yet often complex it can be adopting and integrating new technology.

Don’t worry, you’re in safe hands with Grey Matter Cloud Services:

**Migration**

Need help to transition from aging on-premises software to a modern cloud or hybrid environment?

Grey Matter offers a range of cloud migration tools and services to deliver your smooth and speedy transition to the cloud e.g. Microsoft Azure, Office 365 and Windows 10.

**Management & Support**

We’re here to remove complexity and stress, by delivering a first class support service, to ensure your business productivity is maximised throughout your journey to the cloud. Our team will work with you to assess your system, identify vulnerabilities, mitigate risks, and provide end-to-end system management and monitoring, at a competitive monthly subscription.

**Cloud Backup**

We know your data is important and we recommend a secure cloud backup solution to safeguard your business information in the event of the unexpected.

Visit [www.greymatter.com/hc/cloudservices](http://www.greymatter.com/hc/cloudservices) email services@greymatter.com or call us on +44 (0) 1364 654100 for further information.
Managing the Application Lifecycle


The way we build applications is changing, and the tools we’re using are changing to fit in with and take advantage of these new ways of working. So it’s not surprising to see Visual Studio 2017, and tools from its partners, taking on these new application lifecycle management concepts and building them into the tools on our desktop and into the cloud services they use.

Tim Sneath, Principal Program Manager for Visual Studio at Microsoft described much of this as “moving things left” in the development stack. That’s a term we’ve heard a lot from devops folk as it describes a process of automated testing and deployment, and of blending features from one part of the development process with another. You can see some of this in Visual Studio 2017 where, thanks to the Roslyn compiler-as-a-service features of .NET, unit tests can be run on your code as you write it, and where code coverage analysis is just another feature of the IDE.

Bringing features like this into Visual Studio make a lot of sense, especially as Roslyn is now the default .NET compiler, and works not just with the familiar .NET languages but with Xamarin and Unity, and with the new cross-platform .NET Core. Development today is about a lot more than simply churning out thousands of lines of code.

Part of this change is a shift away from the familiar Software Development Lifecycle (SDLC), which was focused purely on the process of building code, to a much broader Application Lifecycle Management (ALM) approach. Instead of tracking development from requirements gathering to deployment, ALM goes a lot further, wrapping the entire life of a project from initial concept to eventual decommissioning, and encompassing several passes through the old SDLC model. While ALM doesn’t explicitly support devops, it is able to bring in inputs from operations to the development team; and it can be seen as the tooling that is required to deliver the dev in devops.

One of the key features of a well-designed ALM solution is the ability to pick and choose the tools you use as part of your delivery and management platform, thanks to APIs that offer simple integration points. That way you can use Visual Studio as a code editor, GitHub Enterprise as a repository and collaboration platform, Chef for configuration management, Jenkins for integration and as a build pipeline, HockeyApp for device testing, and any of a wide selection of monitoring tools to see what happens once your code’s been deployed.

Microsoft’s ALM platform

Microsoft’s own Team Foundation Server (TFS) 2017 is a big part of its Visual Studio-based ALM tooling. Whether it’s on-premises or in the cloud as Visual Studio Team Services (VSTS), it is a powerful continuous integration tool. You can’t really deliver on the promise of ALM without automation, and having a continuous integration tool as the backbone of your delivery pipeline is key to managing and implementing automated build, test, and deployment.

While TFS is the obvious choice for Microsoft-centric continuous integration, cross-platform and containerised delivery do have other options, with both Jenkins and Travis CI proving popular. VSTS is another option, especially if you’re targeting Azure, either as a platform or using virtual machines (VMs) and containers.

The latest release of TFS Server is a hefty piece of code, designed to run on 64-bit...
Faster Windows® computers with a simple software utility

“WOW! Watch it go! I have 44GB of memory in the physical server and Diskeeper is using around 20GB of it to cache. I can’t imagine having a server without it! Diskeeper 16 is a vastly improved version of Diskeeper!”

Andy Vabulas
Vabulas Enterprises

“With Diskeeper 16 I can tell my workstation is more responsive with no lag or any type of hesitation. Truly SMART Technology!”

William Krasulak, Systems/Network Admin
Nacci Printing Inc.

Caches hot reads from idle, available DRAM.
Makes defrag a thing of the past!
Proactively prevents performance-robbing fragmentation at the Windows OS level
Fully compatible with HDD, SSD, SAN and NAS

To find out more please mention HARDCOPY 71 and call +44(0) 1364 654100, email sales@greymatter.com, or visit bit.ly/Diskeeper-HC71

grey matter
CondusivTM Technologies

© 2017 Condusiv Technologies Corporation. All rights reserved.
One advantage of using ALM tooling is its support for Markdown formatting. As developers can be using anything from Vi and Emacs to Visual Studio or Eclipse, you’re going to need a common formatting language for comments and commit statements around code. Markdown’s simple formatting directives can be used in any editor, and then displayed in the browser. Another increasingly popular feature is emoji support. Emoji has become a convenient shorthand in collaboration, and it’s often easier and quicker to send a thumbs-up or thumbs-down.

Microsoft’s new TFS build tooling is a much-needed improvement. You can jump straight from a build log to the code that caused an error, saving time in interpreting log data and mapping it to a specific file and a specific line. There’s also support for stepping outside the traditional Windows build model into the Java world with tooling for working with common Java build environments like Maven and Gradle, as well as delivering iOS and Android builds from Xamarin.

Enterprise and cloud apps now also get support for containers, with Docker support using Windows Containers as a build target for your code. TFS takes that Docker support a step further, allowing you to deliver code to a Docker Hub instance and then manage deployment to Docker hosts ready for use.

Using containers as a continuous integration endpoint makes sense, as you can use code to define the networks they operate on and the features that the containers need. Once you have defined your containers, deploying a complete application is simply a matter of choosing the right options in your environment settings. Both .NET Core and ASP.NET Core run on Linux so you’re not limited to Windows containers and hosts. The release management tooling in TFS 2017 will deliver your code to the appropriate environment, ready to run, whether it’s a binary, a container, or a web app – or even a set of Azure Resource Manager descriptions.

Continuous integration

Continuous integration has rapidly become a key development methodology, and is vital to the successful delivery of any ALM platform. Code needs to be tested, built, and deployed in an automated fashion. That might mean automatic deployment to app stores or code repositories once tests have been passed, or in many cases the complete deployment of an entire virtual architecture. Support for technologies like containers means that it’s now much easier to consider a complete environment as a build target, rather than selectively deploying elements of an application.

It seems counter-intuitive to consider an entire network of servers and applications as the deliverable at the end of a build, but it makes a lot of sense: instead of considering an environment as something that’s flexible, it needs to be considered as an important entity in its own right. Any change needs to be proved in test and handled by change and configuration management tooling before being deployed, with the option of a quick roll-back to an earlier known good state if necessary. Many application failures result from configuration changes that haven’t been properly tested, so removing this element of risk can help reduce downtime.

ALM has a much bigger view of what an application is than you might initially think. Any application is the sum of its dependencies, including the services and APIs it uses. They’re all factors that need to be considered at all points during development and through the
life of your code, especially if you’re relying on third party APIs or cloud platforms that are updated on their own continuous integration trajectories.

That’s why having an ALM solution is important, and why Visual Studio 2017 and TFS work well together as a foundation that’s flexible and extensible. Microsoft’s history of openness around the Visual Studio platform gives it an advantage as it’s already got an ecosystem of developer tool partners with software that addresses many key developer issues. If the ALM feature you want isn’t in Visual Studio or TFS, then you can probably find it from a partner, or even build it for yourself.

**Third-party tools**

Plugging a third-party tool into Visual Studio 2017 makes a lot of sense. Its built-in Marketplace gives you quick access to a wide selection of both trial versions and full tools that add many new ALM-related features to your IDE.

One popular plug-in is JetBrains ReShaper. Designed to help improve the code you write, it’s a tool that adds on-the-fly code analysis features together with tooling to help you write correct code. Perhaps its best-known feature is its code inspection tooling, showing you errors as you type together with the code that’s affected by your latest edits. Visual indicators show the code that needs to be edited, with tooltips to give more detail and make suggested corrections. There’s support for more than just the familiar .NET languages, with tools to handle ASP.NET MVC and XAML, as well as JavaScript and TypeScript. You can even use ReShaper to debug build scripts to make sure your code compiles correctly.

One advantage of a tool like ReShaper is its support for both code suggestions and hints, which can guide developers in the direction of writing better code. These are generated not when there are errors, but when the tooling detects that code could be improved, perhaps to make it more flexible, or more extensible in the future. Having a software-based pair programmer in your IDE is a surprisingly useful tool, especially when working in a distributed team where code review becomes a complex process. ReShaper’s library of fixes also help, giving you tools to correct your code, and letting you pick an appropriate solution.

As well as inline code inspection, ReShaper can work across an entire project, identifying code that might be redundant. Architects can go beyond the built-in inspection tools to add their own rules, making it easier to handle new APIs and applying coding standards so that the code becomes easier to maintain and easier to migrate to a new version. Similarly, you can use the various refactoring tools to refine your code, for example turning classes into interfaces (or vice versa) as well as handling method calls and managing strings for localisation.

ReShaper’s legacy as a tool for handling .NET refactoring makes it a powerful tool for managing how your code changes, working quickly across an entire solution and not just a single file. Refactoring can also cross language boundaries, so if you change a property name in an XML file, those changes can reflect back into the underlying C# code.

JetBrains offers a large family of .NET tooling, which don’t only work with individual copies of Visual Studio but can become part of an overall approach to code hygiene. By mixing code editor enhancements with profilers and test tooling, working alongside TFS, you can give your developers the IDE they need to interact with much of the tooling necessary for an ALM implementation.

ALM is about a lot more than just the development process. It starts with effective requirements capture and design prototyping. Tools like Infragistics Indigo Studio work here to capture user stories and map them to design prototypes that can then be used to define the APIs and data needed to deliver an application. The same tool can wrap the entire design and development process, getting user feedback at all stages. Collecting actionable feedback and delivering it to designers and developers lets you focus on what elements of the backlog can be addressed in which sprint, and understand what’s most important to users to ensure that development resources don’t get misued.

Other companies that began as component vendors have added support of ALM to their tools. ComponentOne Studio integrates with Visual Studio to facilitate the addition of new controls to your apps, and improve code reuse for .NET and for ASP.NET applications. Where ComponentOne Studio goes the extra mile is in giving you the tooling you need to simplify the use of common JavaScript libraries in HTML/JavaScript Windows Store apps and on the web.

The acquisition of Telerik by Progress has brought its tooling into a cross-platform mobile development platform you can use with your choice of IDE, and a cloud-hosted test platform to ensure your code works across multiple devices. Progress also provides a set of Visual Studio plugins for its test suite which tests across multiple technologies using tests that can be written in familiar .NET languages.

Any ALM solution must go beyond the code of an application and drill down into the APIs it interacts with and the data it uses. That’s why it’s good to see Visual Studio 2017 including Redgate Data Tools as part of the suite available through its installer. ReadyRoll Core is included for handling the automation of database changes, with tooling for source control as well as database development. Using tools like this you can reduce the risk of errors from database upgrades and safely deploy new schema and templates. Other tools included add improved SQL code completion as well as tools that simplify the process of searching for objects across the many databases that you’ll find in a typical enterprise-scale application.

**Beyond the code**

Visual Studio 2017 and its associated tools give you much of what you need to deliver an ALM solution to your development team. Mixing cloud and third party tooling lets you pick and choose the elements you need whatever the code you’re building, whether it’s a simple application for use inside a business, or a cross-platform cloud-powered app with mobile clients on Windows, iOS, and Android.

Whatever combination of tools you use, ALM lets you go beyond your code, giving you a deeper understanding of what your code needs to do, why it needs to do it, and how it’s going to be delivered. It means your apps can be better targeted, better designed, and much more reliable. For developers, architects, project managers, and for users, that all going to be a big win.

**For more information on ALM, see the Grey Matter website at**

www.greymatter.com/corporate/development/

Alternatively call 01364 654100 or email maildesk@greymatter.com.
What’s In Your Code?
Understand Your Security Vulnerabilities & Compliance Issues

FlexNet® Code Insight

FlexNet Code Insight identifies, approves, and tracks third-party content to analyse compliance with your IP and security policies. With over 2.5 million automated detection rules and 12.9 million OSS components, analysis is faster and more accurate leaving your organisation in control of your OSS strategy.

FEATURES INCLUDE:
- Accurate Analysis with Automated Detection Rules
- Act Immediately on Security Alerts
- Automatically Generates Third-Party Notices
- Designed for Enterprise Environments
- Extensive Compliance Library & Language Coverage
- Extra Protection: Integrated Scanning & Authorization

Call Grey Matter on +44 (0) 1364 654100 or email maildesk@greymatter.com and mention HARDCOPY 71 to find out more.

© 2017 Flexera Software LLC. All other brand and product names mentioned herein may be the trademarks and registered trademarks of their respective owners.
Secure and Legal

What can you do to keep your data secure and your applications legal when you’re operating in the cloud? Mary Branscombe explores this new world.

The debate about whether it’s safe to put your data in the cloud is largely settled. The North Bridge Future of Cloud Survey 2016 shows that over 90 percent of companies are using cloud services in production, and half of the companies surveyed believe the cloud is more secure than their own infrastructure.

Cloud services like Azure have advantages of physical and procedural security that are hard for most businesses to match. The small number of staff and guards who can enter the highly automated, unmarked facilities in remote locations, chosen for the combination of high bandwidth and cheap sources of renewable energy, undergo background checks and have to pass through biometric security and physical security checks to get in to the data centre. And when they do, both they and the teams who run the cloud services from the Microsoft offices have far less access to data and workloads than the administrators of the average company.

All the servers are encrypted by BitLocker; hardware that’s been used for ‘high business impact’ workloads never leave the data centre; and hard drives go through a shredder that reduces them to small pellets of metal. Backup generators and automatic failover to other hardware or even another data centre protect from threats like data loss and down time – and even with the occasional human error, availability beats what most businesses could manage themselves.

It’s a long way from many commercial data centres, let alone a server under the desk or in the cupboard in a branch office. “You have to protect your data, but that doesn’t mean it has to be sitting on your own server in your own data centre,” points out Rik Hepworth, IT Director at Microsoft partner Black Marble, which works with highly regulated customers like healthcare providers, local government and police forces: “Can you honestly say your data centre is more secure than the data centres in Azure? If I can drive a JCB through your wall, I’ve got your servers – and that’s easier to organise than you might think.”

Rik Hepworth, IT Director at Microsoft partner Black Marble.

Where is your data?

But the security that the cloud offers still leaves you with a lot of responsibilities. For those highly regulated customers, the thorny issue that remains is data residency; where in the physical world that data is allowed to reside – and what networks does the data transit when it’s being consumed by a service?

Black Marble builds tuServ, a mobile app on phones and tablets for police officers that replaces their paper notebook as a way of gathering evidence. Although it can run on the police force’s own servers, some forces are running it in Azure to reduce hardware and management costs; to get cheaper storage for the audio and video and photos an increasing number of officers are recording on their devices; and to get security and resiliency. “Hosting in Azure takes advantage of Microsoft’s expertise in defending against intrusion,” explains Hepworth.

But it’s the new UK Azure region that’s made that possible. “Microsoft removed a big barrier by opening the UK data centres; so we can do geo-replication for absolute resilience between UK South and UK West. Up until that point, we did have some serious issues to think about and a lot of forces were saying they were not comfortable using the cloud. That wasn’t because of an issue with the security standards of Azure, but rather whether the legislation they have to follow made it clear whether they were allowed to use an Azure data centre located in Europe. Microsoft do make commitments about how they manage data and how it will transit; they’re not going to just suck data into the US.”

Even the Ministry of Defence uses Microsoft’s UK data centre, both for Office 365 and Azure services, and Microsoft recently introduced Azure Blueprint, a service to help UK public sector organisations move workloads into Azure in a compliant fashion. For its consumer email service, Outlook, Microsoft has even gone to court to defend users’ rights not to have their data leave the region without a legal process.

However, although most Azure services are available worldwide, not all services are in every region yet – and the same is true of Azure Stack, Microsoft’s on-premise cloud system, which is best thought of as its own Azure region. Azure Backup is available in the UK region, as is the Key Vault service for managing your own encryption keys, however HDInsight is not. Hepworth is enthusiastic about the Application Insights service: “It’s a really powerful telemetry tool where you can get lots of information about your app to help fix faults and monitor performance.” But because the service doesn’t yet run in the UK region, telemetry data would have to leave the UK to be stored in Europe, so...
they’re not yet using the service. Similarly, Bing Translate would be an ideal tool for translating witness statements into the native language of the witness so they can read them over before they sign - something no police force could develop for itself. Black Marble was able to create a proof of concept in a day and police forces like the way it could lower the communications barrier with witnesses, but they’re not comfortable with those witness statements being sent to US data centres and back. They also want the ability to mark their data so it’s not used to train the service, just as emails and documents stored in Office 365 remain private to your tenant.

The issues are similar for European countries. Although many organisations in the EU are comfortable with data centres located elsewhere within the EU, Microsoft has opened a German Azure region directly run by a German company so that it can comply with German government requirements for managing data. Azure China is run by a Chinese company. But there are many regions in the world that do not have their own Azure service, particularly in the developing world. If you’re in Namibia, for example, then your closest Azure region is in India, while New Zealand has to use Azure services based in Australia or Singapore.

When you’re using ‘the cloud’ it’s important to remember that you’re not just using one thing, or even the same thing everywhere. Where possible, you need to think beyond data residency to data protection. “I shouldn’t care where the data centres are if I’ve made sure that data goes in and out securely, so it can’t be tapped and it can’t be monitored,” points out Hepworth. “It becomes more about how you encrypt it, how desirable the information your app is using is, and how secure it is. Over time, he predicts, “we’ll start to focus more on not where you put the data but on how we put the data there: how do we encrypt it, how do we manage who can touch – and these are things we should be dealing with already.”

When you’re using ‘the cloud’ it’s important to remember that you’re not just using one thing, or even the same thing everywhere. Where possible, you need to think beyond data residency to data protection. “I shouldn’t care where the data centres are if I’ve made sure that data goes in and out securely, so it can’t be tapped and it can’t be monitored,” points out Hepworth. “It becomes more about how you develop apps. You have to think about security and privacy right from the get go; you have to be very careful to think about potential threats, and very aware of how desirable the information your app is using is, and how secure it is. Over time, he predicts, “we’ll start to focus more on not where you put the data but on how we put the data there: how do we encrypt it, how do we manage who can touch – and these are things we should be dealing with already.”

Dealing with data securely can actually be easier in a cloud model. “The cloud opens up lots of different ways that we might manage our information lifecycles that people haven’t caught up with yet because they’re still thinking about tangibles.” For example, if a customer no longer wants you to run a service for them then you can simply sign the subscription over to them, which makes them responsible for overseeing the secure deletion of their data.

Azure has another advantage here because it’s part of a continuum from on-premise Azure Stack, through hosted private cloud to public cloud. “As a developer, we can code using the same approach and standards and technologies, and we can deploy that on a customer network, but if they want to deploy to Azure we don’t have to rewrite the app,” Hepworth points out. That consistency means you can move more out to the cloud as any remaining compliance, security or data residency issues are addressed in the future, and it is easier today to segment your apps so that you divide data and processing between private and public cloud, so simplifying these security decisions.

**What data do you have?**

Before you can think about the security of your data in the cloud, you have to think about the nature of your data. If you’re in healthcare, government or the financial sector, you’re going to be well aware of the regulations your business is governed by, and the data you hold. That’s not always true of other businesses.

Giving evidence to the House of Lords Home Affairs Committee recently, Stewart

### EU Data Protection Regulations

Coming in May 2018, the General Data Protection Regulation (GDPR) puts the onus on businesses to understand and mitigate the risks of storing people’s data. New requirements include greater data access and deletion rules, risk assessment procedures, a Data Protection Officer role for many organisations and a notification process for data breaches. Although GDPR is an EU regulation it will still be relevant post-Brexit to any organisation that offers goods and services to EU residents. Fail to meet it and you could be fined €200 million or 4 percent of your worldwide turnover.

Can cloud services help you reach GDPR compliance? Yes, but simply using a GDPR-compliant service like Azure or Amazon Web Services (AWS) doesn’t automatically protect the apps you build.

The Investigatory Powers Act 2016 requires all communications providers to retain a record of the services to which devices have connected and, when issued with a retention notice, communications data, for a maximum period of 12 months. This information must be made available to law enforcement agencies and other public bodies, without the need for a warrant.

However the wording of the bill is sufficiently vague for the Home Secretary to say that some of its provisions require extensive testing and so won’t be in place for some time, after consultation with industry. That means there’s no immediate impact on businesses, and whether you store customer interactions in the cloud or on your own servers isn’t relevant to the Act.
services@greymatter.com

contact our team at Grey Matter on 01364 654100

If you want to know more about using cloud services securely, please 

Information about tuServ is at 

You can find out more about Black Marble at 

The North Bridge Future of Cloud Survey 2016 is at www.slideshare.net/North_Bridge/2016-future-of-cloud-computing-study. You can find out more about Black Marble at www.blackmarble.com. Information about tuServ is at www.blackmarble.com/tuserv/. If you want to know more about using cloud services securely, please contact our team at Grey Matter on 01364 654100 or email us at services@greymatter.com.

Azure services for enhancing security

Azure provides many services that can help you secure your applications. Azure Active Directory, for example, isn't just for managing users: the commercial tiers support multi-factor authentication and let you view security reports that analyse suspicious logins. Azure Active Directory Identity Protection uses machine learning to suggest updates to your Azure AD configuration and conditional access policies, while Azure Security Center shows you the security state of all your Azure resources, and can make recommendations for improving your security settings. If your application is available to consumers or other businesses, then use Azure AD B2C and B2B for secure identity and access management.

Azure API Management is a gateway that lets you publish APIs that your apps can consume securely, while Azure App Service gives you secure data storage, user authentication and push notification for mobile apps. Log Analytics analyses logs from all your workloads in real time, while Operations Management Suite gives you threat detection across Azure, AWS and on-premise systems.

Then there's ExpressRoute which allows you to set up a private connection to the cloud instead of using a public internet connection. If you are using the internet then you can configure network security groups and make use of user-defined routing, IP forwarding, forced tunnelling and endpoint ACLs. You can also set up the Web Application Firewall to protect your web apps from cross-site scripting and SQL injection.

Azure Storage is already encrypted, and you can encrypt data in Azure File Storage at no extra charge with the new Storage Service Encryption service. You can also encrypt your virtual machine disks using Azure Disk Encryption. Azure Key Vault lets you store secrets like the service keys used by apps, and control the cryptographic keys used to encrypt your data on Azure.

If you're using SQL Server 2016, the ‘always encrypted’ option encrypts data as it’s entered on the client and preserves that encryption on Azure so your apps can search and filter data without needing to decrypt it in transit. There's also the data masking options to help you avoid using production data for development and test. Azure SQL Database Threat Detection uses machine learning to detect suspicious database activity in your Azure SQL Database, and if you want to host a MongoDB database online securely, then you can use DocumentDB as the data store.

Azure Rights Management Service (RMS) lets you set policies for any file type that limit who can view, edit, or copy the file, and you can use it with Azure Information Protection to classify and label sensitive data. Then there's the forthcoming Office 365 Advanced Data Governance service to help you identify important data and reduce data retention issues by removing redundant and obsolete data.
Even if you get your wires crossed, you’ll hear each other perfectly.

- Work from anywhere, anytime
- Business continuity
- Lower costs
- Easy roll out
- More control
- Skype for Business Integration

Learn more: www.greymatter.com/hc/nfon
Call: +44 (0) 1364 655196
Email: cloud@greymatter.com
Kay Ewbank investigates Intel’s recent excursions into Artificial Intelligence.

Intel AI Day

Intel hardware has played a role in just about every implementation of artificial intelligence (AI), but until recently few people would have described that role as particularly significant. Then last year Intel acquired deep learning specialist Nervana Systems, and has used a series of Intel AI Day events to demonstrate its intention to become a key player in the field of deep neural networks (DNNs).

The task of producing a useful neural network is usually split into two workloads, namely training and inference. Training is the part where you teach the neural network its specialist knowledge, and at the moment, this sector tends to use a mix of NVIDIA GPUs (Graphics Processing Units). Intel intends to change that and has used its Nervana portfolio to demonstrate how it is going about it. For developers, the news splits into several areas, namely the hardware that Intel says will replace GPUs; the software they’re making available for developers; and the alliance they have announced with Google to accelerate the use of AI in the enterprise.

Intel’s Stephan Gillich, Director of Technical Computing, Analytics and Artificial Intelligence GTM for Intel’s EMEA Datacenter Group, says the important message is that AI is something that’s happening now, not a future goal to wait for: “AI used to be just a research subject, but various vectors coming together have changed that. Greater processing power means the algorithms running on the processors aren’t limited, and the research methods and deep learning techniques have advanced to the point where they’re really strong. The final element is the availability of endless data to work on, to train neural networks, to provide the underlying information.”

Hardware

At these events Intel has shown off and discussed several new hardware products designed for work with DNN workloads, all of which it claims will be faster than rival GPU-based offerings. The fact that Intel is developing an architecture specifically for AI use shows just how important they believe the AI market to be: this will be the first time one of the major semiconductor companies has targeted anything so specific.

Much of the technology behind the products is based on the Nervana Engine. This is a machine learning chip that was under development at Nervana prior to Intel’s acquisition of the company in 2016. This work has continued at Intel, and the first product to come out of it has been previewed at the Intel AI Day events. Code-named Lake Crest, this is a deep learning accelerator that is purpose-built to train neural networks. The design includes up to 32GB of integrated high bandwidth memory (HBM2), capable of transferring data at 1TB per second with a 2GHz clock speed. Stephan Gillich says Lake Crest will power future best-in-class performance neural networks, and the speakers at the AI events made clear that Intel’s goal is for Nervana technology to achieve a 100-fold improvement for DNNs over today’s “best GPU” solutions by 2020.

Lake Crest will use a numerical format called Flexpoint that has been designed specifically for deep learning codes. Flexpoint is something between fixed and floating point, and offers much higher levels of computational density and lower power per operation on deep learning training codes. Flexpoint gives the precision of floating point, but is more or less as efficient as an integer execution unit, so it can calculate lower-precision floating point at near the rate usually achieved for integer values. This will enable the Lake Crest chip to deliver up to 10 times the parallelism compared to current GPUs. Lake Crest is being tested in the first half of this year and is due to become available later in the year.

A further product called Knights Crest was also announced at the AI Day events. This integrates Xeon processors with Nervana technology, and will be a commercial release that could be available at a lower cost aimed at more general use than the specialist Lake Crest. The integration would be relatively easy from...
an engineering viewpoint, and could build on the experience Intel has had integrating the Altera FPGAs. Then going forward, the Xeon, Core and Quark processors and FPGAs will be optimised with Nervana technology and software, and will be available for use in the inference processing where the trained neural network is put to use.

Work is still continuing on the next generation of Intel Xeon Phi processors (code-named Knights Mill). These are aimed at deep learning applications and will deliver up to four times better performance than current options. They should be available in 2017.

Software

Alongside the hardware, Intel has software for use by data scientists and developers, starting with the Intel Deep Learning SDK. This is a free set of tools for developing, training and deploying deep learning solutions. The SDK includes a training tool and a deployment tool which can be used either separately or together. The project is currently available in beta and supports Intel Distribution for Caffe, with more frameworks and domains to come.

The SDK lets you visualise real-time data when you’re creating DNNs, without the need to program. You can install deep learning frameworks and set up, tune and run deep learning algorithms. This lets you train datasets, design models with automatically optimised hyperparameters, launch and monitor the training of multiple candidate models, and visualise training performance and accuracy.

Stephan Gillich says the SDK is a key element of Intel’s AI software strategy: “Developers and data scientists can develop, train and deploy analytics by using the Deep Learning SDK. The SDK delivers end-to-end performance, a rich user experience and tools to boost productivity. This is one key element of the software stack, along with the Intel Nervana Graph Compiler, that ensures front-ends are usable and optimised for the hardware the stack is running on. We’re actively providing tools to make it faster to get results.”

The Nervana Graph Compiler (ngraph) is currently in preview. The current release consists of an API that can be used to create computational ngraphs; two higher level front-end APIs (TensorFlow and Neon) that make use of the ngraph API for common deep learning workflows; and a transformer API for compiling these graphs and executing them on both GPUs and CPUs.

Gillich describes Graph Compiler as sitting on top of libraries and optimising processes so they run well on the platform. “If you take a front end [such as Neon] and you have a task you want to run optimally on a machine, that’s the role of the Nervana Graph Compiler. It takes as input a graph and finds the optimal set of functions and data layouts to execute the functions.”

Neon is another technology that Intel acquired as part of the Nervana acquisition. Neon is an open source Python-based language and set of libraries for developing deep learning models. The developers say it is more than twice as fast as other deep learning frameworks such as Caffe and Theano, and that this is achieved through assembler-level optimisation, multi-GPU support, optimised data-loading, and use of the Winograd algorithm for computing convolutions.

Alongside the software, Intel has introduced the Intel Nervana AI Academy. This provides online developer access to training and tools. The Academy will host meetups, offer onsite, online and event based training, along with what Intel is describing as “expansion of enablement activities”. The academy has three tracks aimed at students, professional developers and startup companies. The developer track includes certification programs through published training programs, lecture series, competitions and access to tools. The online training provides guides on using Intel’s frameworks and technology, along with more general training on better ways to collect data, analyse it efficiently and present results.

Intel also announced a partnership with training company Coursera to provide a series of AI online courses.

Google Alliance

Alongside the hardware and tools, Intel announced a strategic alliance with Google focusing on Kubernetes (containers), machine learning, security and IoT. In immediate terms, the alliance is working on optimisation of both the TensorFlow library and the Kubernetes open source container management platform.

TensorFlow is a software library that Google made open source in 2015. It was developed for conducting machine learning and DNN research, and shows results using data flow graphs. Kubernetes is another open source project from Google. It can be used to automate the deployment and use of application containers in general, including AI applications.

Gillich told us that the two companies are cooperating to improve both: “We’re working with Google on both TensorFlow and Kubernetes. Our aim is to accelerate TensorFlow on our processors to allow deeper parallelism, and to optimise Kubernetes for the Intel architecture in terms of both performance and improved infrastructure management.”

The work on optimising TensorFlow means deep learning applications should run much faster on Intel processors. The Intel Xeon Phi processor, for example, is designed to scale out in a near-linear fashion across cores and nodes to dramatically reduce the time to train machine learning apps. And TensorFlow can now scale with future performance advancements as Intel continues to enhance its processors to handle even bigger and more challenging AI workloads.

When Intel bought Nervana, many analysts worried that Intel would fail to make full use of the possibilities it offered. The strategy and products announced at Intel AI Day have proved the doubters wrong. Intel intends to become the major player in the neural network market, and is putting a lot of effort into doing so. When mainstream companies like Intel think the time and money is well spent, it means that AI itself is entering the mainstream. As Stephan Gillich says, AI is something that’s happening now, not a future goal that we need to wait for.
Groundbreaking HEVC & AVC Video Performance
Intel® Media Server Studio

Cloud, comms, and video service providers and media application developers can deliver fast, high-density and high-quality video transcoding, streaming, and conferencing with Intel® Media Server Studio. This award-winning¹ suite of tools gives you the power to:

- Access hardware-accelerated codecs and programmable graphics on the latest Intel® platforms, including Intel® Xeon® E3-1500 v5 and 6th generation Intel® Core™ processors.
- Speed the transition to real-time 4K HEVC.
- Innovate new immersive experiences, such as 360 degree videos and virtual reality.
- Achieve all this—while reducing infrastructure and development costs.

Choose From Two Editions

Essentials Edition
Includes Intel® Media SDK, runtimes, graphics drivers, Intel® Media SDK for OpenCL™ Applications, Metrics Monitor for Linux®, Intel® Premier Support, and more.

Professional Edition

Supports HEVC, AVC, and MPEG-2. Windows® and Linux® versions are available.

Phone: +44 (0) 1364 654100
Email: intel@greymatter.co.uk
www.greymatter.com/hc/intel-mss2017


For more complete information about compiler optimizations, see our Optimization Notice at software.intel.com/en-us/articles/optimization-notice#opt-en.

© 2017 Intel Corporation. All rights reserved. Intel, the Intel logo, Intel Core, VTune, and Xeon are trademarks of Intel Corporation in the U.S. and/or other countries.
*Other names and brands may be claimed as the property of others. OpenCL and the OpenCL logo are trademarks of Apple Inc. used by permission by Khronos.
Inside Data

Graham Keitch looks at the importance of Data Lifecycle Management and its relationship to Application Lifecycle Management.

The task of managing data and database systems is similar to Application Lifecycle Management (ALM), although a little more ambiguous. For the business, data is information rather than bits and bytes. Policies will have been put in place to govern its use and purpose to meet the needs of internal users, customers and regulatory requirements. Consequently, we have the notion of Information Lifecycle Management (ILM) and Document Lifecycle Management (DLM).

From an IT perspective, the task is best thought of as two related functions. One concerns the data itself while the other concerns the underlying technology. The former is about availability, security and governance while the latter has more to do with managing the database software and infrastructure that supports it.

Managing the technology is an ongoing task that involves patches, upgrades, performance optimisation and other routine issues. The database team may not always see these tasks in lifecycle terms, but the processes put in place for successful deployment and risk mitigation involve the same careful planning and execution.

The lifecycle of a given database spans the usual ALM phases of design, build, test, deploy, maintain and decommission. The final phase often involves data migration to a new edition or alternative platform, thus initiating a new cycle. These phases are replicated to a greater or lesser degree for smaller routine tasks such as patch management.

Some businesses are choosing to offload database maintenance by adopting Database as a Service (DBaaS) models where the lifecycle chores and more routine matters are handled by the vendor or a service provider such as Grey Matter. I'll return to this later but first, let's take a look at how several major database vendors support lifecycle management.

Oracle Enterprise Manager 12c is a management solution for the entire Oracle stack. As expected from one of today's leading database vendors, it contains a Database Lifecycle Management Pack. This automates tasks associated with discovery, provisioning, cloning and patching and also configuration, change and compliance.

Oracle also provides Options that can be purchased for its flagship Database Enterprise Edition to assist with data lifecycle management. Both Oracle Advanced Compression and Partitioning Options can help manage data growth and the resources that underpin it. Oracle Multitenant is a container database that can host multiple pluggable tenants. The container is the only instance that has to be managed from the point of view of patching and upgrading, so bringing together numerous potential lifecycle tasks into one.

Microsoft database customers have SQL Server Management Studio (SSMS) at their disposal for configuring, managing and administering SQL Server. This includes script editors and graphical tools which work with objects and features of the server. It's a free download from Microsoft and there is a more basic Express edition for less demanding situations. The tool will assist with many of the tasks required to manage lifecycle issues.

The day to day overheads of managing your own database can be off-loaded to the vendor or a third party service provider. This applies to both the software as well as the storage, back-up and security of the data. Many businesses are adopting cloud solutions for this, although most are doing so using hybrid models that provide greater flexibility and lower levels of risk for what is generally a business's most important IT asset. The cloud is also an ideal environment for the development, building and testing of database systems.

There are various levels of Oracle Database Cloud Service covering single schemas, dedicated pluggable databases and virtualised databases. A bare metal option is expected soon. There is also the option to deploy on Oracle's own infrastructure for the most critical and demanding use cases. Most of these services allow full administrative control by the user but Oracle's Database Schema Cloud Service and Exadata Express Cloud Service are fully managed by the vendor. Oracle's Data Backup Service also has components relevant to data lifecycle requirements. The Data Expiration feature automatically expires data that is no longer needed.

SQL Database is Microsoft's DBaaS implementation of their SQL Server engine on Azure. It supports existing SQL Server tools including SSMS as well as libraries and APIs. The dynamic nature of the cloud allows you to increase or decrease processing and storage capacity on demand. Azure's elastic pools allocate the necessary resources for this to ensure the databases auto-scale within set parameters and budget as required.

Useful third party tools include Redgate's SQL Toolbelt for SQL Server and Deployment Suite for Oracle. Cross platform tools such as idera's DB Artisan, ER/Studio and DB Change Manager are invaluable too.

Oracle's multitenant database helps consolidate lifecycle and resource management tasks.
In February 2017 Microsoft’s Mads Torgersen posted an item about the company’s .NET language strategy. It is worth a read for anyone considering programming language choices for new projects, or where to focus your training.

Torgersen discusses three .NET languages, namely C#, Visual Basic and F#. He says that C# is used by millions and is a well-loved language. “We’ve been good at evolving it tastefully and pragmatically, addressing new challenges while keeping the spirit of the language intact,” he claims. He adds that C# is perceived as “almost synonymous with .NET”, meaning that as long as .NET exists, so too will C#.

F# is also a language Microsoft cares about. F# is a functional programming language, ideal for analytics and data manipulation. It is strong in the financial industry, and skilled F# developers command high salaries. Torgersen refers to its “phenomenally engaged community”, and promises that the company will continue to improve its tooling and ensure good interoperability with C#. That promise was delivered in Visual Studio 2017, which has a greatly improved F# editor.

F# also runs on .NET Core, the open source and cross-platform version of .NET. But what about Visual Basic? Torgersen reveals that most VB developers, according to Microsoft’s research, build Windows business applications using Windows Forms, and a few “are building websites, overwhelmingly using ASP.NET Web Forms.” This implies that VB developers are not at the cutting edge of technology, since these frameworks are old and have to some extent been replaced by WPF (Windows Presentation Foundation) or UWP (Universal Windows Platform) for the desktop, and ASP.NET MVC for web applications.

That said, Torgersen adds that VB has “twice the share of new developers as it does of all developers,” suggesting that it remains strong as a beginner’s language. BASIC stands for ‘Beginner’s All-purpose Symbolic Instruction Code,’ so this is true to its roots.

The consequence is that Microsoft has shifted its VB strategy away from parity with C#, as in Visual Studio 2015, and towards a ‘core scenario’ policy. This is why VB version 15, which is the Visual Studio 2017 version, has only a subset of the new features in C# 7.0.

Another issue is that Xamarin, Microsoft’s cross-platform mobile toolkit, uses C# but does not support VB.

None of this should come as a surprise. In the .NET world, VB was never quite the equal of C#, the new language designed alongside the platform. Microsoft’s .NET Framework was launched in early 2002, at a time when Visual Basic 6 was the most popular programming language for Windows business applications. VB.NET was also launched, but it was incompatible with VB6 and porting was not straightforward, not only due to language differences, but also because of the then-new Windows Forms GUI framework. Many VB developers either stuck with VB6, or jumped to C#. The language has been in slow decline ever since, despite having advantages over C# in some areas.

What does this mean for VB developers? Let’s be clear about one thing: Microsoft is not abandoning VB any time soon; in fact, it is still being actively developed, despite the change in focus. “Same great tooling … same great platform … same great language,” as Microsoft’s VB language designer Anthony D Green said recently.

It is also worth noting that VBA, based on VB6, remains the macro language of Microsoft Office. This means that even the old VB runtime is still part of Windows, and will be supported far into the future. Even though running the VB6 development environment on Windows 10 is tricky, the applications it creates generally run fine, if you can cope with a few issues around ActiveX component compatibility.

Just because you can do something, does not mean that you should. The original Visual Basic was a marvel in its day, but there was plenty wrong with it. Microsoft was right to replace it, and it is right to focus now on C#. According to the programming help site StackOverflow, C# is relatively well liked by developers, ranking 8th in best-loved languages (well ahead of Java at 17th), while VB6 is top of the “Most dreaded,” followed by VBA in 2nd place and VB.NET in 4th.

So, if you do have an application in VB.NET, you will not run into any difficulties maintaining it, but for new projects, or anything that falls outside the core scenarios outlined by Microsoft, it is time to switch.

**Reading the Runes**

Should you pay attention to developer trends? Or should you keep your head down with your current projects as there is too much to do anyway? Since you are reading this I guess you do believe in paying attention to what is coming next, a practice that is always worthwhile. Of course today’s trend may be forgotten tomorrow (Silverlight anyone?) but there are often insights that can guide future planning to good effect.

I have been reading a couple of new reports: one from Vision Mobile on The State of the Developer Nation, and the other the latest...
in the Technology Radar series from Thoughtworks.

Technology Radar is not so much a survey as a set of opinions from a large software development company with an Agile tradition. This time around the topics include Conversational UI, Natural Language Processing and Intelligence as a Service, which caught my eye having recently experimented with Microsoft’s Bot Framework and Cognitive Services.

“Building conversational and natural language user interfaces, while presenting new challenges, has obvious benefits,” says the Radar. There is also more visibility for this type of UI, thanks to Amazon Echo, Google Home, and personal assistants such as Apple Siri, Google Now and Microsoft Cortana.

The team suggest building “conversationally aware APIs,” the key attribute being the ability to manage conversation states so that users don’t have to repeat the context of their enquiry. This “can be hard to build on top of many existing APIs,” according to the report.

Technology Radar also observes the rise of Python: “Its ease of use as a general programming language, combined with its strong foundation in mathematical and scientific computing, has historically led to its grassroots adoption by the academic and research communities. More recently, industry trends around AI commoditisation and applications, combined with the maturity of Python 3, have helped bring new communities into the Python fold.”

There is a link here, since Python is a popular language for interacting with natural language processing and other intelligence services. The Vision Mobile report also observes this trend. Investigating the popularity of machine learning languages: “Python leads the pack, with 57 percent of data scientists and machine learning developers using it and 33 percent prioritising it for development … Python is recognised as the main language that one needs to experiment with to find out what machine learning is all about.”

Vision Mobile also reports on the cloud wars between Amazon Web Services, Microsoft Azure, Google Cloud Platform and others, and on cloud versus internal deployments. Bear in mind that this report is based on a survey of developers, rather than covering the whole spread of those who use cloud computing. According to its report, 51 percent of internal applications are still self-hosted, a figure which is smaller than I had expected. The business going to cloud platforms is huge and still growing.

Amazon “leads at every company size,” says the report, though in the smallest companies not by all that much: 15 percent Amazon, 12 percent Microsoft, 11 percent Google.

As company size grows, Amazon becomes more dominant, with 26-27 percent share. Microsoft’s share stays around the same at 11-13 percent, but Google’s declines towards 5 percent in the biggest companies.

The report confirms that Google still has work to do in building both trust and mindshare in enterprises, as opposed to among small businesses and consumers where it is already strong.

Finally, Vision Mobile looks at another hot topic, Augmented Reality (AR) and Virtual Reality (VR). While the rise of machine learning and intelligence services seems a safe bet, the future of AR and VR is harder to judge. Still, if you do get into this area, the report identifies the tool of choice: the Unity platform and accompanying C# language is most popular by far, with 30 percent usage among the developers surveyed, versus 16 percent for the next most popular (C/C++).
I am faced with a quandary. A client is working on an app which fronts a piece of hardware. The market sector and functionality isn’t relevant to the discussion, and I won’t name names. However, they are building an app in both Android and iOS versions. This of itself is not unusual – the customer base for their product, and the combination of the software and hardware, has to support both iOS and Android users.

What is unusual is the decision to throw the rule-book out of the window when it comes to UI conventions, especially in the case of the iOS product. If you go to the Apple website, there are a huge long set of UI design recommendations, and the tools with which to implement them.

Now I have absolutely no problem with the concept of throwing away the rulebook and writing your own UI. It is indeed one of the most fascinating experiences when reading Petzold nearly thirty years ago. The idea that you took responsibility for the window’s contents, and it was entirely up to you to maintain state and be able to repaint any of it at a moment’s notice, was fascinating to someone coming from the Stone Age of DOS, CP/M or even PrimeOS before that!

The problem with defining your own look and feel is that it becomes a self-fulfilling prophecy. All of the learning that the user has made, both consciously and subconsciously, in the operation of the standard UI gets thrown out of the window when you paint your own UI.

To be clear, this can be a huge advantage. I remember with fondness a set of paint tools called Kai’s Power Tools, which took a radical new design idea, and threw all preconceptions out of the window. (Or was that Window?) It worked too and showed what was possible.

But when it comes to a mainstream app, which does the usual select, play, choose track and so forth, it is very hard to see what has been gained by writing the UI from scratch. Especially when you really throw the baby out with the bathwater and insist on taking away the top line status bar too, so you cannot see how your battery is holding out, or any other status information that might go up there, including the clock. (Interestingly, their Android version manages to keep the top bar in place.)

And I have no problems with black user interface designs for those applications where light pollution is an issue, or whether colour acuity could be compromised by an overall background tone. When it is done ‘just to be different’, then I find my hackles rising.

At the end of the day, design decisions have to be made. But all too often, it seems that app developers allow themselves far too much reign to try something ‘cool’ or ‘distinctive’, without the cold hard reality of user experience being brought to bear. My rule of thumb is simple: when I see a custom UI design, I require a full written justification for what is wrong with the standard UI tools. And “No” is my usual answer, because most times the claim that the standard UI tools won’t do the required tasks simply means that the tasks haven’t been clearly defined or thought through. At the end of the day, you cannot ask the user to learn your pet design methodology just because you want to be cool.

And petulant designers just hate the word “No”, which adds to the fun immensely, I find.

**Release schedules**

What is considered to be an acceptable release schedule? I ask the question because it is clear that the expectations, both of the user and of the developer, are changing rapidly. Back in the past, a team defined a product, they wrote it, and then delivered it. A few bug fixes might follow on, although the discipline and expense of sending out floppy disks was quite a good reality check for the financial spreadsheets of the team leaders.

Then along came the web and the possibility to deliver ever changing ‘content’ to the user. Unfortunately, the same viewpoint appears to have filtered back to apps and OS development too. Whilst I have no issues with using the power of the internet to distribute patches to bugs, and to do so in a fast and timely fashion, things get a little more weird when the very definition of what is being delivered, and when, becomes foggy. After all, if you can’t get Feature X to work right, then just wait a few more weeks and then ship it out on the next drop.

It would be churlish to be disdainful of the rapid rate of development progress that this can bring. However, all too often this can lead to an emerging sense that nothing is ever ‘finished’: That there is no target that is being aimed for, and then the results delivered. And from that comes quite a subtle but important disconnect between the development team and the customers, especially over the cycle of delivery and expectation management.

The best teams handle this very well. I would applaud the way that Microsoft is… and another thing

Jon Honeyball sets his sights on UI design, release schedules and the importance of surround audio to VR.
handling the rollouts of Office, for example. You can get the standard update cycles, or you can sign up for the Office Insider Program to get things in advance of the mainstream release. And there are two speeds, Office Insider Slow and Fast, for those who want to get a little closer to the bleeding edge.

The user expectation is clear here – you get the newest things early if you are on Office Insider Fast, but it might not be totally stable or suitable for a production environment. Insider Slow trades off speed of access for better stability. And if you are being cautious, then the main release cycle is the one for you.

However, the new era of ‘continuous downloads’ means you actually have no real idea what is going on.

Having the conversation with your customers about the timescales they want, and how they want to receive it, is becoming critical. For home customers, frequent updates is rarely a big problem, provided the operation is seamless, simple and reliable. However business customers can take a very dim view of updates being pushed out all the time. Much here is defined by the market into which you serve product, but communication is key here. Set expectations appropriately and then deliver to them. Nothing grates more than a promised released schedule that fails to materialise. And when this happens time after time, the customer’s rightful view of your development team is that it is staffed by morons.

**Surround audio and VR**

Much is happening in the world of Virtual Reality, and some of the really interesting stuff is actually in surround sound. Although the visual part gets all the “oohs” and “aahs”, the sound component is critically important.

In the surround sound world, there is one big player, namely the Soundfield system. A fully surround microphone system that captures left/right, up/down, front/back plus an all-around omni signal, the system stores this in something called B-Format. (A-format is what comes natively from the microphone – you can tell the British inventors of this stuff were really into flashy branding).

The Soundfield microphone technology is still around, both from Soundfield itself which has recently been sold to Rode Microphones, and also from third party vendors.

Why does this matter? Because once you take B-format and output it to binaural, and then feed that into headphones that have head position tracking built in, you can build soundscapes that take account of how the head is moving in real time. All of this is critically important to getting compelling VR to work well. Rode has promised a Video Soundfield microphone to complement its existing range of mic systems which will clip into a camera hotshoe, but record the full surround signal. And hopefully delivered at a price which is much more affordable than traditional Soundfield microphones.

And this technology is all over the place: just pop a smartphone into a cardboard headset arrangement. Google, Microsoft, YouTube and others all have content delivery systems in place that support the surround format, along with VR visuals too. If you are working with audio, or audio-visual content that goes beyond standard stereo, then this is a technology you need to be considering. Even something as simple as stereo audio in binaural format can be truly compelling, as the BBC is demonstrating with its various binaural format broadcasts of events, concerts and so forth. This is a robust technology, and the customer expectations are changing fast, especially in the new world order where people listen on headphones through their smartphone.
Cut Slack some slack!
Spare a thought for Slack. One minute the Canadian communications vendor was world leader in enterprise (i.e. grown-up) chat systems, loved by late night comedy writers and Risk and Compliance officers alike. The next, Microsoft had its tanks parked firmly on Slack’s lawn with the launch of its own grown-up chat app, the notably Slack-esque Teams. It was no laughing matter.

Microsoft has a long track record of spotting a good idea once someone else has had it. In the early 1980s it spotted the Apple Mac’s GUI and came up with Windows, a move which so enraged Steve Jobs that he spent the next decade trying to sue for copyright infringement. It also spotted Lotus 1-2-3, the original spreadsheet with built-in business graphics, and came up with Excel, a spreadsheet with built-in business graphics. Then it spotted Netscape Navigator, the first graphical web browser, which came with its own scripting language, JavaScript. Not too long afterwards it launched Internet Explorer, a graphical web browser with a built-in scripting language called JScript.

None of this is illegal, of course, and Slack itself didn’t invent the chatroom. But in a world where Apple can sue Samsung for putting rounded corners on its phones, Microsoft does seem to have found standing on the shoulders of pioneers surprisingly trouble-free.

Slack’s response was to write an open letter to Microsoft, welcoming it to the chat vendor family while warning that it took more than just features to earn the loyalty of customers. Thoughtfulness and craftsmanship (and love) were equally important, it counselled, as was an open platform that allowed third-party vendors to pick up crumbs from the table, Microsoft does seem to have found standing on the shoulders of pioneers surprisingly trouble-free.

Slack’s response was to write an open letter to Microsoft, welcoming it to the chat vendor family while warning that it took more than just features to earn the loyalty of customers. Thoughtfulness and craftsmanship (and love) were equally important, it counselled, as was an open platform that allowed third-party vendors to pick up crumbs from the table, Microsoft does seem to have found standing on the shoulders of pioneers surprisingly trouble-free.

Decoding Diplomacy
Slack’s open letter to Microsoft may appear to be written in English, but in fact it’s coded in PostTruthScript, a new language for non-actionable allegation interchange developed at the Ballmer Institute for Corporate Diplomacy in Boise, Idaho. Here’s Short Cuts’ translation of some key sections:

“We’re genuinely excited to have some competition.”
We’re not Apple, so we can’t afford to sue you.

“We realized a few years ago… that every business would be using Slack, or ‘something just like it,’ within the decade.

“We knew this was coming, but were hoping to IPO first.

“First, and most importantly, it’s not the features that matter.”
The features really matter, and you’ve nicked ours, you *********!

“The revolution that has led to millions of people flocking to Slack has been driven by something much deeper”
... namely the pockets of our investors, but they’ll be getting a tad edgy now that your tanks are on our lawn.

“We’ve spent tens of thousands of hours talking to customers”
Yeah, we know that was dumb – but hey, we’re a startup!

“We’re glad you’re going to be helping us define this new product category.”
Two can play at the feature-nicking game, you *********!

“We love our work”
Are there any jobs going at Redmond?

[that’s enough translations – Ed]

A bit harsh!
Short Cuts is a huge fan of JetBrains, the Prague-based tools developer that’s so agile it probably free-runs over the rooftops to work every morning. However sometimes even the most nimble of organisations can put a foot wrong.

Looking at the screenshots for the 2017.1 release of its YouTrack issue-tracking app, we came across one that showed a user apparently being banned for taking parental leave. Call us wishy-washy liberals, but we think that’s a bit harsh, and a quick chat with Short Cuts’ HR Risk and Compliance officer confirmed that banning someone for taking parental leave would, indeed, be a one-way ticket to an employment tribunal, as would banning them for being sick, injured, pregnant or on their summer holidays.

We’re sure it’s all a misunderstanding, but would also like to assure JetBrains that the gig economy hasn’t completely taken over yet, contrary to whatever rumours may be floating around in these febrile times. Perhaps “Suspend Access” would be a more diplomatic way to put it.
Develop for the future with Visual Studio 2017

New Visual Studio 2017 provides you with all you need to build any app, game, or extension for Android, iOS, Windows, Linux, web, and cloud.

- Go mobile and build high performance apps with beautiful user interfaces with Xamarin for Visual Studio 2017.
- Easily create cloud-first apps with a built-in suite of Azure tools.
- Deploy your application faster with the complete DevOps solution.

Call our Microsoft Visual Studio 2017 experts now on +44 (0)1364 654100, email: licensing@greymatter.com or visit greymatter.com/hc/V2017 for more information on developing any app on any platform.
Here is why you should attend this workshop:

- Learn about practical Machine Learning and Deep Learning on Intel platforms.
- Learn from experts during in depth technical sessions in the areas of High Performance Computing, Numerical Simulation to Machine Learning, Analytics, and Artificial Intelligence.
- Learn how to super-charge your Python codes.
- Find out more about roofline profiling with Intel Advisor.
- Learn about the current and future technologies from Intel, including next generation Intel® Xeon and Intel® Xeon Phi™ (aka Knights Landing) processors, and also the 3D XPoint™ memory technology and the Intel® Omni-Path Fabric.
- Learn how to maximize the performance of parallel code using C / C++, Python or Fortran on Intel® platforms with relevant and actionable information.
- Meet and network with your peers from the industry and with software development experts and leaders from Intel.
- The agenda has been strongly updated since the Dublin workshop in February 2016, so even if you attended that one it certainly does make sense to join us again.

If you have any questions about the event, other upcoming events in the UK, or would like a copy of the agenda, please email information@greymatter.com or call +44 (0) 1364 654100.

In partnership with:
grey matter