MegaTrends in Telecom

- **convergence**
- **network capacity and economics**
- **mobile internet**
- **telecom and content delivery**
- **smart devices**
- **video explosion**
- **year of google**
- **network services and apps and app stores**
- **cloud computing & services**

1) convergence :
i)Background :

There is widespread agreement that convergence is occurring at the technological level. That is to say that digital technology now allows both traditional and new communication services - whether voice, data, sound or pictures - to be provided over many different networks. Current activity in the market suggests that operators from the sectors affected by convergence are acting on the opportunities provided by technological advances to enhance their traditional services and to branch out into new activities. Telecommunications, Media and Information Technology sectors are seeking cross- product and cross-platform development as well as cross-sector share-holding. Examples of new products and services being delivered include:

–   Home-banking and home-shopping over the Internet,

–   Voice over the Internet;

–   E-mail, data and World Wide Web access over mobile phone networks, and the use of wireless links to homes and businesses to connect them to the fixed telecommunications networks;

–   Data services over digital broadcasting platforms; – On-line services combined with television via systems such as Web-TV, as

well as delivery via digital satellites and cable modems; –   Webcasting of news, sports, concerts and of other audiovisual services.

Such developments represent concrete examples of an Information Society in Europe. They show its potential to touch the lives of every citizen. They also highlight a significant change in the range and diversity of traditional telecommunications and media services.

ii) definition and scope :

the ability of different network platforms to carry essentially similar kinds of services, or the coming together of consumer devices such as the telephone, television and personal computer.

in a way it can be described as -

"any idea developed today should run on all the three platforms with out changing it "
mobile being the first,laptop or pc is the second, telivision being the third .

iii) the enable role of technology

Computer technology now plays a key role in content creation and production in both cinema and broadcasting worlds. The ways in which audio-visual material is produced, delivered and consumed are evolving. Content is becoming "scaleable" so that it can be used in different environments and delivered on different network infrastructures. The basic building block is the MPEG family of standards for the digital encoding of moving images.6   Once encoded in this format, images may be modified, manipulated, or transmitted in the same way as any other digital information. The systems and networks handling such information are of course indifferent to the nature of the source material, be it image, sound or text. Digital source encoding thus forms the basis of technological convergence.

iv) conclusion :

The emergence of new services and the development of existing services are expected to expand the overall information market, providing new routes to the citizen and building on Europe's rich cultural heritage, its potential for innovation and its creative ambitions.

The global nature of communications platforms today, particularly, the Internet, are providing a key which opens the door to the further integration of the World economy. At the same time, the low cost of establishing a presence on the World Wide Web, is making it possible for businesses of all sizes to develop a regional and global reach. Globalisation will be key theme in future developments, as changes in Europe are mirrored by developments all over the World.

Network Capacity and Economics

• Bandwidth demand is growing almost exponentially
• Video is the major contributor, impacting both wireless and broadband networks • More spectrum will be needed for mobile networks; but also more efficient use of the spectrum; LTE is one of the answers
• More network capacity will need to be deployed, but network economics will be very critical
• Network optimization and backhaul / access optimization will be a major area of focus
• Cloud Computing will be part of the answer – more on this later! • Also need better distribution of content , better allocation of processing

between network and devices
- Need better tools for policy management, and
- Need regulatory flexibility re Net Neutrality, etc.

long tail economics :

The 'long tail' was first introduced by Chris Anderson in *Wired* magazine circa October 2004. Anderson based the theory on a statistical concept called 'long-tailed distribution.' Since then, it has become one of the most significant new business concepts driven by the internet age, and is applicable to almost all industries.

A long tail simply implies that if a company supplies a certain product that is difficult to get a hold of, the sum of demand from lots of different places will be big enough to make supplying it feasible.

We see this concept emerging within the web analytics' sector: Google has provided easier, more flexible tools to everyone, and the demand for more detailed, specific analytics' data has increased dramatically.

Within a traditional high-street purchase environment, catering to the demand for a niche product for a tiny group of customers simply isn't feasible. This is especially relevant in smaller towns and shops, but when the same niche demand exists across the world, the combination of a lot of smaller groups makes up a much larger market.

Amazon, Netflix and iTunes are the most notable of internet giants catering to this need. Each site provides consumers the opportunity to purchase books, movies or songs they could never before find in bricks-and-mortar stores. The sales/rentals of these items won't be huge, but due to the low cost of storage, transacting and shipping, it becomes an extremely viable business and often competes head-to-head with the total sales generated by the big contemporary hits.

5) smarter devices :

i) PDA:

The PDA has been accepted by many construction firms to aid the management of punch lists, safety inspections, and maintenance work. They can be thin or thick devices, but are often a combination of the two, having connectivity, but containing programs to operate even when out of range of WiFi or coverage. PDAs are durable, inexpensive, and very portable (being worn on a clip or carried in a pocket). The small screen size and limited ability to quickly enter data are

the drawbacks of this device.

ii) **Smart phones**

A smart phone is basically a mobile phone and PDA combined into one IA. Other functionalities such as digital camera and voice recorder are common. Data entry, like with the PDA, is by stylus or keypad and cumbersome. Many have web browsing capabilities but the small screen size diminishes the utility of this function to viewing email, weather reports, or some web content. Both PDA and smart phones have calendars, task lists, and phone lists, but they are useful to superintendents when coupled with the phone functions as is the case with the latter. opular devices include the Blackberry and Treo, the pocket pc, Iphone and Droid all are popular because of their web/email abilities and ease of use.

iii) Operating System: In general, a smartphone will be based on an operating system that allows it to run productivity applications. BlackBerry smartphones run the BlackBerry OS, while other devices run the Palm OS or Windows Mobile. There are smartphone OSes that are pared-down versions of desktop Linux, too.

iv) Software: While almost all cell phones include some sort of software (even the most basic models these days include an address book or some sort of contact manager, for example), a smartphone will have the ability to do more. It may allow you to create and edit Microsoft Office documents--or at least view the files. It may allow you to download applications, such as personal and business finance managers. Or it may allow you to edit photos, get]driving directions via GPS, and create a playlist of digital tunes.

v) Web Access: More smartphones can access the Web at higher speeds, thanks to the growth of 3G data networks and the addition of Wi-Fi support to many handsets. Still, while not all smartphones offer high-speed Web access, they all offer some sort of access. You can use your smartphone to browse your favorite sites.
QWERTY Keyboard: By our definition, a smartphone includes a QWERTY keyboard. This means that the keys are laid out in the same manner they would be on your computer keyboard--not in alphabetical order on top of a numeric keypad, where you have to tap the number 1 to enter an A, B, or C. The keyboard can be hardware (physical keys that you type on) or software (on a touch screen, like you'll find on the iPhone).

- Top 5 mobile app development skills in demand :

Bangalore: As the tech predictions suggest, mobile app industry is going to be one of high tech's hottest sectors. As per a new study by research firm Gartner, mobile applications downloaded from online stores will be a $58

billion worldwide business by 2014. Driven by the popularity of the iPhone and Android operating system, the demand for skilled app developers is reaching the highest point ever. This trend is likely to follow the fast growth of iPhone projects which saw more than 8,800 jobs completed on Elance in 2009. In addition, Android is rising fast in the ranking of skills in demand, with more than 170 projects posted in early 2010. Analyzing the increasing demand for mobile app developers we have picked up five mobile application skills that are ruling the job market of app developers today.

1. Java : Application programming for Android-based cell phones is primarily done in Java. Android includes a set of core libraries that provides most of the functionality available in the core libraries of the Java programming language. Having Java as the base language, is one of the key assets of Android as a whole and one of its key success factors. Google will engage engineers to create a range of apps from games to services based on users' location, and for the purpose it is hunting for mobile app developers who are at home with Java.

2. Objective C
Apple's iPhone has created a great buzz in the Smartphone industry because of its rich UI and plethora of features. The demand for iPhone app developers is increasing and knowing the new platform and skills is all what developers need to do. Writing objective C program code from scratch, ability to use existing APIs and knowledge of various frameworks needed for development is must thing which iPhone developers should know.

3. HTML5

Although there has been no finalized HTML5 standard, but a lot of web browsers, and even mobile web browsers, have now some HTML5 capabilities. And, it will really help in the development cycle for basic applications. HTML5 will take us miles forward and diminish the difference between the desktop and the mobile environment. HTML5 is a critical step for mobile web application development. Some of the key elements that it provides are - offline support, canvas and video, geolocation API and advanced forms.

4. HB++

HB++ is considered to be one of the best development environments for Windows mobiles and Palm OS smartphones. HB++ for Palm OS is designed to accelerate the development of robust, enterprise-grade Palm OS applications for today's mobile workforce. With the use of HB++, developing handheld applications and connecting them to the enterprise data becomes fast and easy.

5. Silverlight

Microsoft Silverlight is a website application development framework that is indeed these days as it incorporates multimedia, animation and graphics. Although Adobe's incumbent Flash platform remains more popular, it is competing with Flash, java FX and AJAX as

well in the world of mobile app development. Apart from providing high quality video, Silverlight application development also gives complete control over rich media content to the content providers.

The list of certainly not exhaustive. Adding to the above five skills, there are some other mobile app development skills as well that the employers are creating demand for. Some of theses skills are - Qt, Adobe Flash Lite, CSS programming, Python and Apple's proprietary Xcode development language. As the sales of mobile devices is growing, so as the demand for specialized talents.

case studies a)

windows phone 7 :

"Windows® Phone 7 provides an exciting new opportunity for companies and developers to build applications that travel with users, are interactive and attractive, and are available whenever and wherever users want to work with them.
By combining Windows Phone 7 applications with on-premises services and applications, or remote services and applications that run in the cloud (such as those using the Windows Azure™ technology platform), developers can create highly scalable, reliable, and powerful applications that extend the functionality beyond the traditional desktop or laptop; and into a truly portable and much more accessible environment.

This guide describes a scenario around a fictitious company named Tailspin that has decided to encompass Windows Phone 7 as a client device for their existing cloud-based application. Their Windows Azure-based application named Surveys is described in detail in a previous book in this series, *Developing Applications for the Cloud on the Microsoft Windows Azure Platform*. For more information about that book, see the page by the same name on MSDN® at (http://

9) cloud computing :

i) definition Cloud computing is Internet-based computing, whereby shared resources, software and information are provided to computers and other devices on-demand, like electricity.

 one word that gives good definition for cloud is " *virtualization* "
  which says no need of hardware .

ii) Introduction   :

 Imagine yourself in the world where the users of the computer of today's internet world don't have to run, install or store their application or data on their own computers, imagine the world where every piece of your information or data would reside on the Cloud (Internet). As a metaphor for the Internet, "the cloud" is a familiar cliché, but when combined with "computing", the meaning gets bigger and fuzzier. Some analysts and vendors define cloud computing narrowly as an updated version of utility computing: basically virtual servers available over the Internet. Others go very broad, arguing anything you consume outside the firewall is "in the cloud", including conventional outsourcing. Cloud computing comes into focus only when you think about what we always need: a way to increase capacity or add capabilities on the fly without investing in new infrastructure, training new personnel, or licensing new software. Cloud computing encompasses any subscription-based or pay-per- use service that, in real time over the Internet, extends ICT's existing capabilities. Cloud computing is at an early stage, with a motley crew of providers large and small delivering a slew of cloud-based services, from full-blown applications to storage services to spam filtering. Yes, utility-style infrastructure providers are part of the mix, but so are SaaS (software as a service) providers such as Salesforce.com. Today, for the most part, IT must plug into cloud-based services individually, but cloud computing aggregators and integrators are already emerging

iii) concept :

The Concept Cloud computing is Internet ("cloud") based development and use of computer technology ("computing"). It is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet.

Users need not have knowledge of, expertise in, or control over the technology infrastructure "in the cloud" that supports them. The concept incorporates infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS) as well as Web 2.0 and other recent technology trends which have the common theme of reliance on the Internet for satisfying the computing needs of the users. Examples of SaaS vendors include Salesforce.com and Google Apps which provide common business applications online that are accessed from a web browser, while the software and data are stored on the servers. The term cloud is used as a metaphor for the Internet, based on how the Internet is depicted in computer network diagrams, and is an abstraction for the complex infrastructure

v) <u>evolution :</u>

Cloud Computing Technology 2.1 Comparison: Cloud computing is often confused with grid computing ("a form of distributed computing whereby a 'super and virtual computer' is composed of a cluster of networked, loosely-coupled computers, acting in concert to perform very large tasks"), utility computing (the "packaging of computing resources, such as computation and storage, as a metered service similar to a traditional public utility such as electricity") and autonomic computing ("computer systems capable of self-management"). Indeed many cloud computing deployments as of 2009 depend on grids, have autonomic characteristics and bill like utilities — but cloud computing can be seen as a natural next step from the grid-utility model. Some successful cloud architectures have little or no centralized infrastructure or billing systems whatsoever, including peer-to-peer networks like Bit Torrent and Skype and volunteer computing like 2.2 Implementation: The majority of cloud computing infrastructure as of 2009 consists of reliable services delivered through data centers and built on servers with different levels of virtualization technologies. The services are accessible anywhere that has access to networking infrastructure. The Cloud appears as a single point of access for all the computing needs of consumers. Commercial offerings need to meet the quality of service requirements of customers and typically offer service level agreements. Open standards are critical to the growth of cloud computing and open source software has provided the foundation for many cloud computing implementations. 2.3 Characteristics: As customers generally do not own the infrastructure, they merely access or rent, they can avoid capital expenditure and consume resources as a service, paying instead for what they use. Many cloud-computing offerings have adopted the utility computing model, which is analogous to how traditional utilities like electricity are consumed, while others are billed on a subscription basis. Sharing "perishable and intangible" computing power among multiple tenants can improve utilization rates, as servers are not left idle, which can reduce costs significantly while increasing the speed of application development. A side effect of this approach is that "computer capacity rises dramatically" as customers do not have to engineer for peak loads. Adoption has been

enabled by "increased high-speed bandwidth" which makes it possible to receive the same response times from centralized
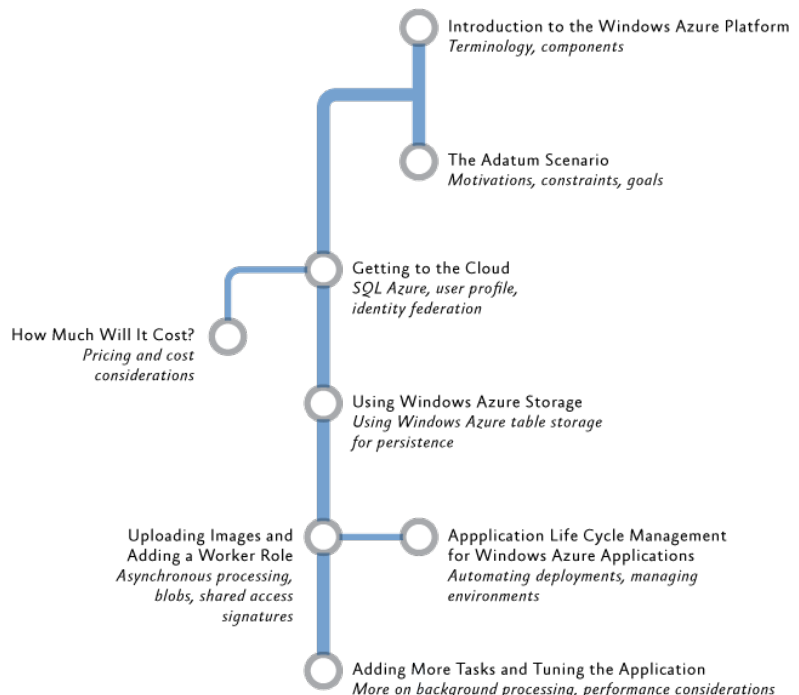
case study :

i) windows azure :

Overview

This book is the first volume in a planned series about the Windows® Azure™ platform. It demonstrates how you can adapt an existing, on-premises ASP.NET application to one that operates in the cloud. The book is intended for any architect, developer, or information technology (IT) professional who designs, builds, or operates applications and services that are appropriate for the cloud. This book is primarily written for people who work with Windows-based systems. You should be familiar with the Microsoft .NET Framework, Microsoft Visual Studio®, ASP.NET, SQL Server®, and Microsoft Visual C#®.

Common Scenarios

"**Introduction to the Windows Azure Platform**" provides an overview of the platform to get you started with Windows Azure. It describes web roles and worker roles, and the different ways you can store data in Windows Azure. It's probably a good idea that you read this before you go to the scenarios.

Introduction to the Windows Azure Platform
Terminology, components

The Adatum Scenario
Motivations, constraints, goals

Getting to the Cloud
SQL Azure, user profile, identity federation

How Much Will It Cost?
Pricing and cost considerations

Using Windows Azure Storage
Using Windows Azure table storage for persistence

Uploading Images and Adding a Worker Role
Asynchronous processing, blobs, shared access signatures

Appplication Life Cycle Management for Windows Azure Applications
Automating deployments, managing environments

Adding More Tasks and Tuning the Application
More on background processing, performance considerations

"**The Adatum Scenario**" introduces you to the Adatum company and the aExpense application. The following chapters describe how Adatum migrates

the aExpense application to the cloud. Reading this chapter will help you understand why Adatum wants to migrate some of its business applications to the cloud, and it describes some of its concerns.

"**Getting to the Cloud**" describes the first steps that Adatum takes in migrating the aExpense application. Adatum's goal here is simply to get the application working in the cloud, but this includes "big" issues, such as security and storage.

"**How Much Will It Cost?**" introduces a basic cost model for the aExpense application running on Windows Azure and calculates the estimated annual running costs for the application. This chapter is optional. You don't need to read it before you go on to the following scenarios.

"**Automating Deployment and Using Windows Azure Storage**" describes how Adatum uses PowerShell scripts and the Microsoft Build Engine (MSBuild) to automate deploying aExpense to Windows Azure. It also describes how Adatum switches from using SQL Azure to Windows Azure Table Storage in the aExpense application and discusses the differences between the two storage models.

"**Uploading Images and Adding a Worker Role**" describes adding a worker role to the aExpense application and shows how aExpense uses Windows Azure Blob Storage for storing scanned images.

"**Application Life Cycle Management for Windows Azure Applications**" discusses how to manage developing, testing, and deploying Windows Azure applications. This chapter is optional. You don't need to read it before you go on to the last scenario.

"**Adding More Tasks and Tuning the Application**" shows how Adatum adds more tasks to the worker role in the aExpense application. In this phase, Adatum also evaluates the results of performance testing the application and makes some changes based on the results.

Audience Requirements

The book is intended for any architect, developer, or information technology (IT) professional who designs, builds, or operates applications and services

that are appropriate for the cloud. Although applications do not need to be based on the Microsoft® Windows® operating system to work in Windows Azure, this book is written for people who work with Windows-based systems. You should be familiar with the Microsoft .NET Framework, Microsoft Visual Studio®, ASP.NET, and Microsoft Visual C#®.

System Requirements

These are the system requirements for running the scenarios:

- Microsoft Windows Vista SP1, Windows 7, or Microsoft Windows Server 2008 (32-bit or 64-bit)
- Microsoft Internet Information Services (IIS) 7.0
- Microsoft .NET Framework 3.5 SP1 or later
- Microsoft Visual Studio® 2008 SP1
- Windows Azure Tools 1.1 for Microsoft Visual Studio
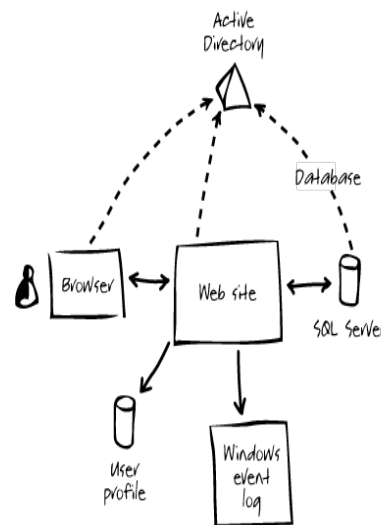- Windows Identity Foundation

Design Goals

This first guide focuses on migration scenarios. It introduces a fictitious company named Adatum which step-by-step modifies its expense tracking and reimbursement system, aExpense, so that it can be deployed to Windows Azure.

aExpense is built with ASP.NET 3.5, it is deployed in Adatum's data center, and is accessible from the Adatum intranet. The application relies on the Microsoft Active Directory® directory service to authenticate employees. It also uses Active Directory to access some of the user profile data that the application requires, for example, an employee's cost center and manager.

The Expense application uses a simple SQL Server® database for storing application data, and the application uses LINQ to SQL as its data access mechanism. The application is configured to connect to SQL Server by using integrated security, and the website uses a service account to log on to the database.

Adatum identified some specific goals.
The aExpense application in the cloud

must be able to access all the same data that the on-premises version of the application can access. This includes the business expense data that the application processes and the user profile data, such as a user's cost center and manager that it needs to enforce the business rules in the application. However, Adatum would like to remove any dependency on Active Directory from aExpense and avoid having the application call back into Adatum from the cloud.

A second goal is to make sure that operations staff have access to the same diagnostic information from the cloud-based version of aExpense as they have from the existing on-premises version of the application.

A significant concern that Adatum has about a cloud-based solution is security, so a third goal is to continue to control access to the aExpense application based on identities administered from within Adatum, and to enable users to access the application by using their existing credentials. Adatum does not want the overhead of managing additional security systems for its cloud-based applications.Overall, the goals are to migrate aExpense to the cloud while preserving the user experience and the manageability of the application, and to make as few changes as possible to the existing application.

Community

This guide, like many patterns & practices deliverables, is associated with a community site. On this community site, you can post questions, provide feedback, or connect with other users for sharing ideas. Community members can also help Microsoft plan and test future guides, and download additional content such as extensions and training material.

Future Plans

A second part is planned to cover "greenfield" scenarios. Check the community site for updates.

Feedback and Support

Questions? Comments? Suggestions? To provide feedback about this [type of deliverable], or to get help with any problems, please visit the Windows Azure Architecure Community site. The message board on the community site is the preferred feedback and support channel because it allows you to share your ideas, questions, and solutions with the entire community. The Windows Azure Architecture Guide is a guidance offering, designed to be reused, customized, and extended. It is not a Microsoft product. Code-based guidance is shipped "as is" and without warranties. Customers can obtain support through Microsoft Support Services for a fee, but the code is considered user-written by Microsoft support staff.