UNIT III
UNDERSTANDING CLOUD SERVICES, APPLICATIONS AND CAPACITY PLANNING

3.1 Types of Services provided by Cloud

- Software as a Service (SaaS)
- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)

Service Oriented Architecture

- Elastic Computing
- On Demand Computing

3.2 Cloud services

3.2.1 Software as a Service

Software as a Service (SaaS) is a cloud computing model where software applications are hosted and maintained by a third-party provider and made available to customers over the internet. Here's an overview of SaaS and its key characteristics:

Characteristics of Software as a Service (SaaS):

1. **Accessibility and Delivery:**
   - **Internet-Based Access:** Applications are accessed through a web browser or dedicated software interface, eliminating the need for on-premises installation.
   - **Subscription Model:** Typically offered on a subscription basis, where customers pay a recurring fee (monthly or annually) for access to the software.
2. **Managed by the Provider:**
   - **Infrastructure and Maintenance:** The SaaS provider manages the infrastructure, including servers, databases, and software updates.
   - **Security and Compliance:** Providers ensure data security, backups, and compliance with industry regulations (e.g., GDPR, HIPAA).
3. **Scalability and Flexibility:**
   - **Elasticity:** SaaS applications can scale horizontally to handle varying workloads and user demands without user intervention.
   - **Customization:** Often allows some degree of customization through configuration options rather than full-scale code modifications.
4. **Multi-Tenancy:**
   - **Shared Infrastructure:** Multiple customers (tenants) access the same instance of the software, benefiting from economies of scale and shared resources.
   - **Isolation:** Ensures data security and privacy through logical and physical isolation mechanisms.
5. **Examples of SaaS Applications:**
   - **Productivity Tools:** Microsoft Office 365, Google Workspace (formerly G Suite).
   - **Customer Relationship Management (CRM):** Salesforce, HubSpot.
   - **Enterprise Resource Planning (ERP):** SAP Business ByDesign, Oracle NetSuite.
   - **Communication and Collaboration:** Slack, Zoom, Dropbox.

Advantages of SaaS:

- **Cost Efficiency:** Eliminates upfront costs for hardware and software licenses, with predictable subscription-based pricing.
- **Accessibility:** Accessible from any device with an internet connection, facilitating remote work and collaboration.
- **Scalability:** Easily scale up or down based on business needs without

additional infrastructure investments.

- **Maintenance and Updates:** Providers handle maintenance, updates, and security patches, ensuring optimal performance and security.

Considerations:

- **Data Security:** Relies on the provider’s security measures and compliance certifications. Organizations must assess data handling practices.
- **Integration:** Compatibility with existing IT systems and APIs for seamless integration with other applications.
- **Vendor Lock-in:** Potential dependency on a single provider’s ecosystem, affecting flexibility and data portability.

3.2.2 Platform as a Service

Platform as a Service (PaaS) is a cloud computing model that provides a platform allowing customers to develop, run, and manage applications without the complexity of building and maintaining the underlying infrastructure. Here’s a comprehensive overview of PaaS and its key characteristics:

Characteristics of Platform as a Service (PaaS):

1. **Development Tools and Frameworks:**
   - **Integrated Environment:** PaaS offers a comprehensive development environment with tools, libraries, and frameworks necessary for application development.
   - **Support for Multiple Languages:** Typically supports various programming languages (Java, Python, .NET, Node.js, etc.) and development frameworks.
2. **Middleware Capabilities:**
   - **Built-In Services:** Includes middleware services such as databases, messaging queues, caching, and identity management.
   - **API Integration:** Enables integration with other services and APIs provided by the PaaS provider or third-party vendors.
3. **Deployment and Scalability:**
   - **Automated Deployment:** Simplifies deployment processes with automated provisioning and configuration management.
   - **Scalability:** Provides automatic scaling capabilities to handle varying workload demands, ensuring performance and availability.
4. **Managed Services:**
   - **Infrastructure Management:** PaaS providers manage underlying infrastructure components, including servers, networking, and storage.
   - **Maintenance and Updates:** Handles maintenance tasks such as software updates, security patches, and system monitoring.
5. **Benefits of PaaS:**
   - **Speed and Efficiency:** Accelerates application development and deployment timelines by providing ready-to-use development environments and services.
   - **Cost Savings:** Reduces upfront infrastructure costs and operational expenses associated with managing hardware and software infrastructure.
   - **Focus on Innovation:** Enables developers to focus on application logic and innovation rather than infrastructure management.
6. **Examples of PaaS Offerings:**
   - **Microsoft Azure App Service:** Enables developers to build, deploy, and scale web apps and APIs without managing infrastructure.
   - **Google App Engine (GAE):** Provides a platform for developing and hosting web applications using Google's infrastructure.
   - **AWS Elastic Beanstalk:** Allows quick deployment and management of applications using AWS cloud services.

Use Cases for Platform as a Service (PaaS):

- **Web Application Development:** Rapidly develop and deploy web applications and APIs using pre-built components and services.
- **Microservices Architecture:** Build and manage microservices-based applications with ease of scalability and integration.
- **DevOps Integration:** Facilitate continuous integration and deployment (CI/CD) workflows with built-in automation and monitoring tools.
- **Data Analytics and IoT:** Utilize PaaS for processing and analyzing large volumes of data or managing IoT devices and applications.

Considerations:

- **Vendor Lock-in:** Evaluate compatibility and portability of applications and data when choosing a PaaS provider.
- **Security and Compliance:** Assess security measures, data protection practices, and compliance certifications offered by the PaaS provider.
- **Integration with Existing Systems:** Ensure seamless integration with existing IT infrastructure, databases, and external APIs.

3.2.3 Open SaaS and SOA

- Open SaaS (Software as a Service) and SOA (Service-Oriented Architecture) are two related concepts in the realm of software development and cloud computing. Here’s an overview of each concept and how they relate to modern software architecture:
- **Open SaaS (Software as a Service):**
- **Definition:**
- **SaaS Model:** Open SaaS refers to a SaaS (Software as a Service) application that offers greater flexibility, customization, and interoperability compared to traditional closed or proprietary SaaS offerings.
- **Customization:** Allows customers to customize and extend the functionality of the SaaS application through open APIs, plugins, or integrations with third-party services.
- **Open APIs:** Provides well-documented APIs that enable developers to integrate the SaaS application with other systems or build custom extensions.
- **Key Characteristics:**
- **Interoperability:** Supports integration with external applications and services through open standards and APIs.
- **Flexibility:** Offers configurable options and tools that enable users to tailor the SaaS solution to meet specific business needs.
- **Community Collaboration:** Encourages collaboration and community-driven innovation through open-source components, plugins, or marketplace ecosystems.
- **Examples:**
- **WordPress:** An open SaaS platform for website creation and content management, allowing users to extend functionality through plugins and themes.
- **Salesforce AppExchange:** A marketplace for extending Salesforce CRM with third-party apps and integrations, showcasing the open SaaS model.
- **Service-Oriented Architecture (SOA):**
- **Definition:**
- **Architectural Approach:** SOA is an architectural style that structures software applications as a collection of loosely coupled services.
- **Service:** Each service implements a specific business functionality and communicates with other services through well-defined interfaces (typically APIs).
- **Interoperability:** Promotes interoperability and reuse of services across different applications and platforms.

- **Key Characteristics:**
- **Modularity:** Decomposes complex applications into smaller, manageable services that can be developed, deployed, and maintained independently.
- **Scalability:** Supports horizontal scaling by distributing services across multiple nodes or containers.
- **Flexibility:** Allows services to be composed and orchestrated to fulfill specific business processes or workflows dynamically.
- **Examples:**
- **Microservices:** A modern implementation of SOA where applications are built as a collection of small, independent services that communicate through APIs.
- **Enterprise Service Bus (ESB):** Middleware technology that facilitates communication and integration between diverse applications and services in an SOA environment.
- **Relationship Between Open SaaS and SOA:**
- **Interoperability:** Both concepts emphasize the importance of interoperability and integration through well-defined APIs and standards.
- **Flexibility and Customization:** Open SaaS leverages SOA principles to provide customizable and extensible services that can be integrated with other systems.
- **Modularity and Reusability:** SOA's modularity and service reusability principles support the development and deployment of open SaaS applications that can adapt to evolving business needs.

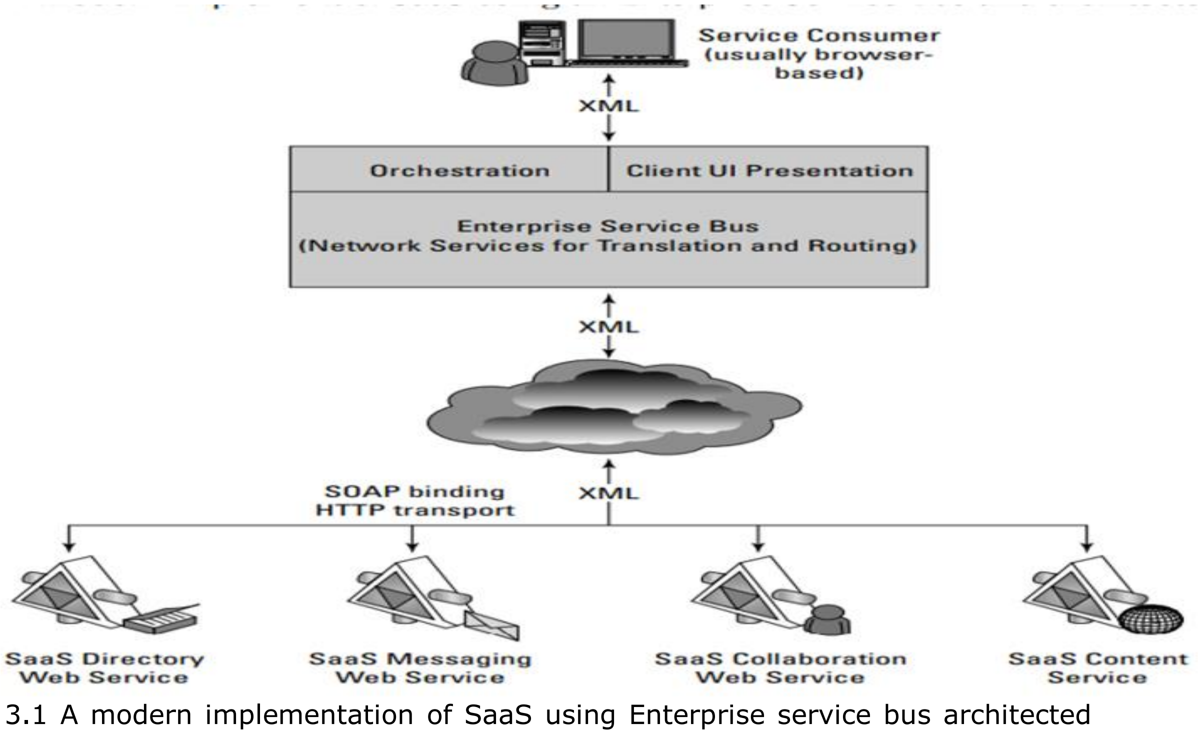

Service Consumer (usually browser-based)
XML
Orchestration
Client UI Presentation
Enterprise Service Bus (Network Services for Translation and Routing)
XML
SOAP binding
HTTP transport
XML
SaaS Directory Web Service
SaaS Messaging Web Service
SaaS Collaboration Web Service
SaaS Content Service

Fig 3.1 A modern implementation of SaaS using Enterprise service bus architected with SOA.

3.2.4 Defining Identity as a Service (IDaaS)

Identity as a Service (IDaaS) is a cloud-based service that provides identity and access management (IAM) capabilities to users and organizations. Here's a comprehensive definition and overview of IDaaS:

Definition of Identity as a Service (IDaaS):

1. **Cloud-Based Identity Management:**
    - **Service Model:** IDaaS is a cloud-delivered service model that simplifies identity and access management (IAM) for users, applications, and devices.
    - **Core Functions:** Provides centralized authentication, authorization, user provisioning, and access governance functionalities.
2. **Key Features and Capabilities:**
    - **Single Sign-On (SSO):** Enables users to access multiple applications and services with a single set of credentials.
    - **Identity Federation:** Integrates with external identity providers (IdPs) using protocols like SAML, OAuth, and OpenID Connect for seamless authentication across different domains.
    - **Multi-Factor Authentication (MFA):** Enhances security by requiring additional verification methods (e.g., SMS, biometrics) beyond passwords.
    - **User Provisioning and De-Provisioning:** Automates user lifecycle management, including onboarding, offboarding, and role-based access control (RBAC).
    - **Access Governance:** Monitors and audits user activities, enforces security policies, and ensures compliance with regulatory requirements.
3. **Benefits of IDaaS:**
    - **Scalability:** Easily scales to support growing numbers of users and applications without the need for additional infrastructure investments.
    - **Ease of Integration:** Integrates with existing IT systems, applications, and cloud services through standardized protocols and APIs.
    - **Cost Efficiency:** Reduces operational costs associated with managing on-premises IAM infrastructure and support.
    - **Enhanced Security:** Provides robust security controls, including MFA, adaptive authentication, and continuous monitoring, to protect against unauthorized access and data breaches.
4. **Use Cases for IDaaS:**
    - **Enterprise SSO:** Streamlines access to corporate applications and resources for employees, partners, and contractors.
    - **Customer Identity and Access Management (CIAM):** Manages user identities and access across customer-facing applications and services.
    - **Cloud Application Integration:** Secures access to cloud-based applications (SaaS) while ensuring compliance and data protection.
5. **Examples of IDaaS Providers:**
    - **Okta:** Offers a comprehensive IDaaS platform with SSO, MFA, lifecycle management, and API access management capabilities.
    - **Azure Active Directory (Azure AD):** Microsoft's cloud-based identity and access management service integrated with Microsoft 365 and Azure services.
    - **Ping Identity:** Provides IDaaS solutions for secure access management across hybrid IT environments.

Figure 3.3 shows how these different standards form an identity service framework

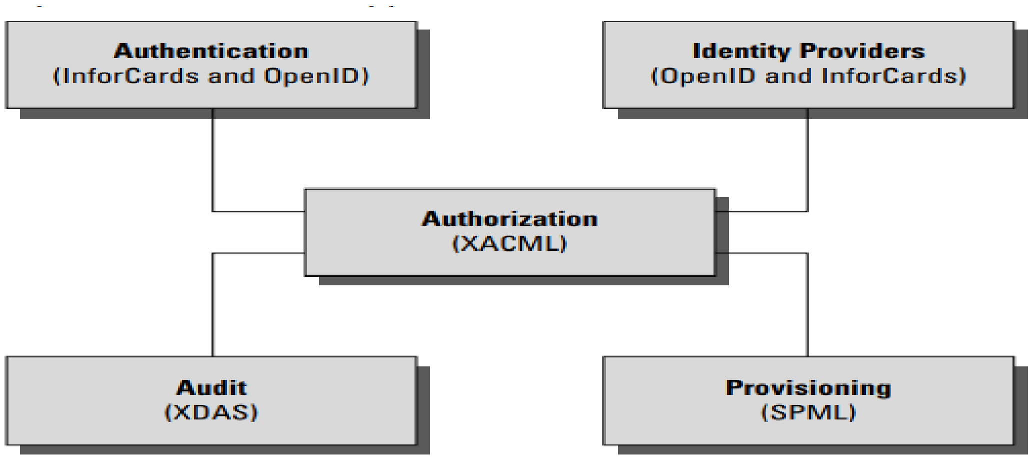


Fig. 3.3 Open standards that support an IDaaS infrastructure for cloud computing

3.2.5 Defining Compliance as a Service (CaaS)

Compliance as a Service (CaaS) is a cloud-based service model that helps organizations manage and maintain regulatory compliance requirements efficiently. Here's an overview and definition of Compliance as a Service:

Definition of Compliance as a Service (CaaS):

1. **Cloud-Based Compliance Management:**
   - **Service Model:** CaaS leverages cloud computing to provide tools, resources, and expertise for managing regulatory compliance requirements.
   - **Core Functionality:** Offers automated solutions, workflows, and documentation to ensure adherence to industry regulations, standards, and policies.
2. **Key Features and Capabilities:**
   - **Regulatory Monitoring:** Monitors and tracks changes in regulatory requirements, ensuring organizations stay updated with compliance obligations.
   - **Audit and Assessment Management:** Facilitates internal and external audits, assessments, and certifications to verify compliance status.
   - **Policy and Procedure Management:** Centralizes policies, procedures, and controls to align with regulatory frameworks and industry best practices.
   - **Risk Management:** Identifies, assesses, and mitigates compliance risks through proactive monitoring and reporting.
   - **Incident Response and Remediation:** Provides frameworks and tools to respond to compliance incidents, breaches, and violations promptly.
3. **Benefits of Compliance as a Service:**
   - **Cost Efficiency:** Reduces costs associated with manual compliance management processes and dedicated compliance teams.
   - **Scalability:** Scales resources and capabilities based on organizational needs and regulatory changes without additional infrastructure investments.

   - **Automation and Efficiency:** Automates compliance workflows, tasks, and reporting, improving operational efficiency and accuracy.
   - **Expertise and Guidance:** Access to specialized compliance expertise, advice, and best practices from CaaS providers.
   - **Continuous Monitoring:** Offers continuous monitoring and real-time alerts on compliance status and deviations.
4. **Use Cases for Compliance as a Service:**
   - **Financial Services:** Ensures compliance with regulations like GDPR, PCI DSS, and SOX for financial transactions and data protection.
   - **Healthcare:** Manages HIPAA compliance for protecting patient health information and maintaining data security.
   - **Government and Public Sector:** Achieves regulatory compliance with standards and policies governing public sector operations.
   - **Global Organizations:** Supports multinational compliance requirements across different jurisdictions and legal frameworks.
5. **Examples of CaaS Providers:**
   - **Datica:** Specializes in compliance and security solutions for healthcare organizations, offering HIPAA compliance as a service.
   - **CompliancePoint:** Provides CaaS solutions for data privacy, GDPR compliance, and cybersecurity standards across industries.
   - **AWS Compliance Center:** Amazon Web Services offers resources and tools to help customers achieve and maintain regulatory compliance in the cloud.

3.2. 6 Capacity Planning

3.6.1 Baseline measurements

There are two important overall workload metrics in this LAMP system:
Page views or hits on the Web site, as measured in hits per second
Transactions completed on the database server, as measured by transactions per second.
In Figure 3.4, the historical record for the Web server page views over a hypothetical day, week, and year are graphed. These graphs are created by summing the data from the different servers

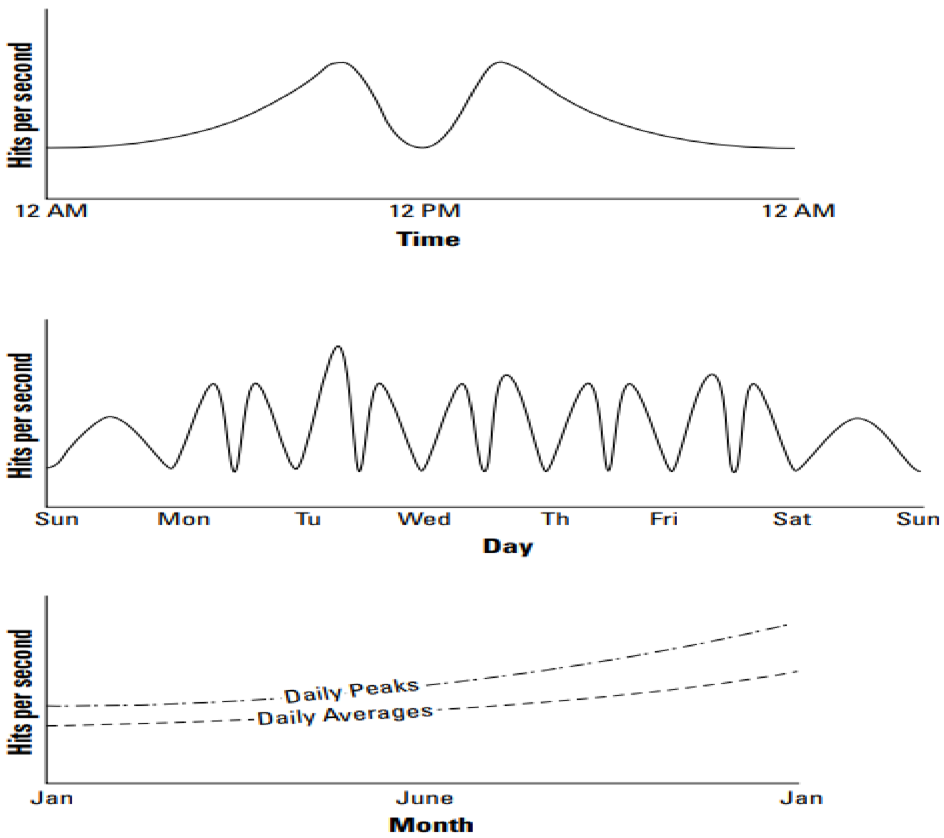


Fig 3.4 A Web servers' workload measured on a day, a week, and over the course of a year

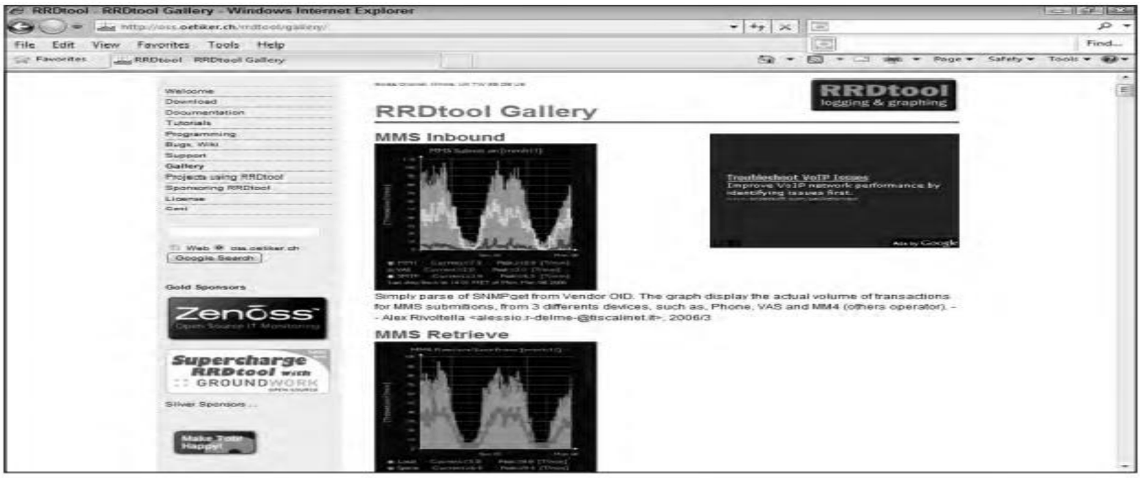
3.6.2 System metrics Capacity planning must measure system-level statistics, determining what each system is capable of, and how resources of a system affect system-level performance.

A machine instance (physical or virtual) is primarily defined by four essential resources:

- CPU
- Memory (RAM)
- Disk
- Network connectivity.

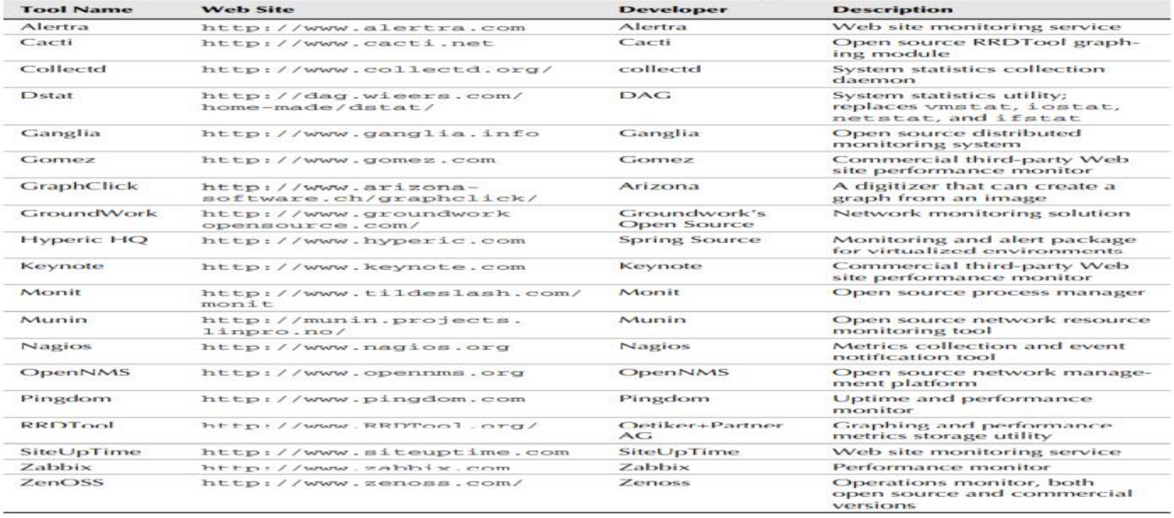
Each of these resources can be measured by tools that are operating-system-specific, but for which tools that are their counterparts exist for all operating systems.

RRDTool is a utility that can capture time-dependent performance data from resources such as a CPU load, network utilization (bandwidth), and so on and store the data in a circular buffer. It is commonly used in performance analysis work. Figure 3.5 shows some of the examples from a gallery of RRDTool graphs found at http://oss.oetiker.ch/rrdtool/gallery/.



Simply parse of SNMPget from Vendor OID. The graph display the actual volume of transactions for MMS submitions, from 3 differents devices, such as, Phone, VAS and MM4 (others operator). - - Alex Rivoltella <alessio.r-delme-@tiscalinet.it>, 2006/3

Fig 3.5 RRDTool lets you create historical graphs of a wide variety of performance data. Some samples are shown in the gallery at http://oss.oetiker.ch/rrdtool/gallery/. Table 3.1 lists some LAMP performance testing tools



Tool Name	Web Site	Developer	Description
Alertra	http://www.alertra.com	Alertra	Web site monitoring service
Cacti	http://www.cacti.net	Cacti	Open source RRDTool graphing module
Collectd	http://www.collectd.org/	collectd	System statistics collection daemon
Dstat	http://dag.wieers.com/home-made/dstat/	DAG	System statistics utility; replaces vmstat, iostat, netstat, and ifstat
Ganglia	http://www.ganglia.info	Ganglia	Open source distributed monitoring system
Gomez	http://www.gomez.com	Gomez	Commercial third-party Web site performance monitor
GraphClick	http://www.arizona-software.ch/graphclick/	Arizona	A digitizer that can create a graph from an image
GroundWork	http://www.groundwork opensource.com/	Groundwork's Open Source	Network monitoring solution
Hyperic HQ	http://www.hyperic.com	Spring Source	Monitoring and alert package for virtualized environments
Keynote	http://www.keynote.com	Keynote	Commercial third-party Web site performance monitor
Monit	http://www.tildeslash.com/monit	Monit	Open source process manager
Munin	http://munin.projects.linpro.no/	Munin	Open source network resource monitoring tool
Nagios	http://www.nagios.org	Nagios	Metrics collection and event notification tool
OpenNMS	http://www.opennms.org	OpenNMS	Open source network management platform
Pingdom	http://www.pingdom.com	Pingdom	Uptime and performance monitor
RRDTool	http://www.RRDTool.org/	Oetiker+Partner AG	Graphing and performance metrics storage utility
SiteUpTime	http://www.siteuptime.com	SiteUpTime	Web site monitoring service
Zabbix	http://www.zabbix.com	Zabbix	Performance monitor
ZenOSS	http://www.zenoss.com/	Zenoss	Operations monitor, both open source and commercial versions

Table 3.1 LAMP Performance Monitoring Tools

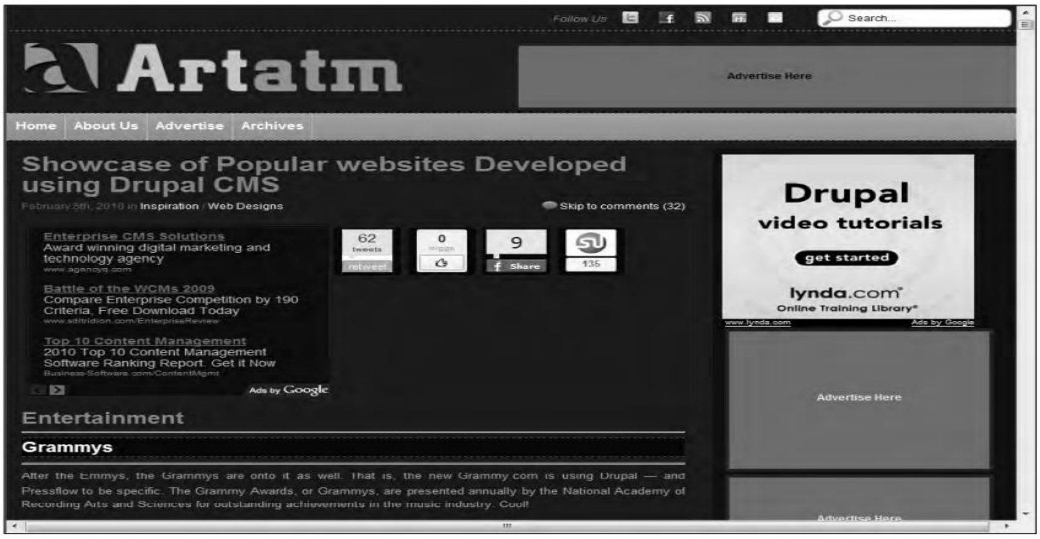
UNIT IV
EXPLORING PLATFORM AS A SERVICE(PaaS)
4.1 PaaS Application Frameworks

4.1.1 Drupal

Drupal is a popular open-source content management system (CMS) that powers millions of websites and applications. It is known for its flexibility, scalability, and robustness, making it suitable for a wide range of use cases from simple websites to complex enterprise applications. Here are some key aspects of Drupal:

Key Features of Drupal:

1. **Content Management:**
   - Drupal allows users to easily create, manage, and organize content using a flexible and customizable content model.
   - Content types, fields, and taxonomies can be defined and customized to fit specific needs.
2. **User Management:**
   - Role-based access control (RBAC) allows administrators to define user roles and permissions.
   - Users can be categorized into different roles with specific permissions to access, create, edit, and delete content.
3. **Extensibility and Customization:**
   - Drupal has a modular architecture with thousands of modules (plugins) available in its ecosystem.
   - Modules can extend core functionality or add new features such as e-commerce, forums, social networking, and more.
4. **Themes and Layouts:**
   - Drupal offers a robust theming system that allows developers to create custom themes or use pre-built themes.
   - Themes control the appearance and layout of the site, providing flexibility in design.
5. **Multilingual Support:**
   - Built-in multilingual capabilities allow sites to be translated into multiple languages.
   - Content translation, language detection, and language-specific configurations are supported out of the box.
6. **Scalability and Performance:**
   - Drupal can handle high traffic and large volumes of content with caching mechanisms, database optimizations, and scalable infrastructure configurations.
   - It supports distributed environments and can be deployed across multiple servers for improved performance.
7. **SEO-Friendly:**
   - Drupal provides tools and modules to optimize websites for search engines.
   - Clean URLs, meta tags, XML sitemap generation, and other SEO features are supported natively or through modules.



Showcase of Popular websites Developed using Drupal CMS

February 5th, 2010 in Inspiration / Web Designs

Skip to comments (32)

Enterprise CMS Solutions
Award winning digital marketing and technology agency
www.agencyq.com

Battle of the WCMs 2009
Compare Enterprise Competition by 190 Criteria. Free Download Today
www.sdltridion.com/EnterpriseReview

Top 10 Content Management
2010 Top 10 Content Management Software Ranking Report. Get it Now
Business-Software.com/ContentMgmt

Ads by Google

Entertainment

Grammys

After the Emmys, the Grammys are onto it as well. That is, the new Grammy.com is using Drupal — and Pressflow to be specific. The Grammy Awards, or Grammys, are presented annually by the National Academy of Recording Arts and Sciences for outstanding achievements in the music industry. Cool!

Fig 4.1 Artatm.com has a gallery of some of the more attractive and well-known sites built with Drupal.

4.1.2 Eccentex AppBase 3.0

Eccentex AppBase 3.0 is a low-code platform designed for building and deploying enterprise applications quickly and efficiently. Here are some key aspects and features of Eccentex AppBase 3.0:

Key Features of Eccentex AppBase 3.0:

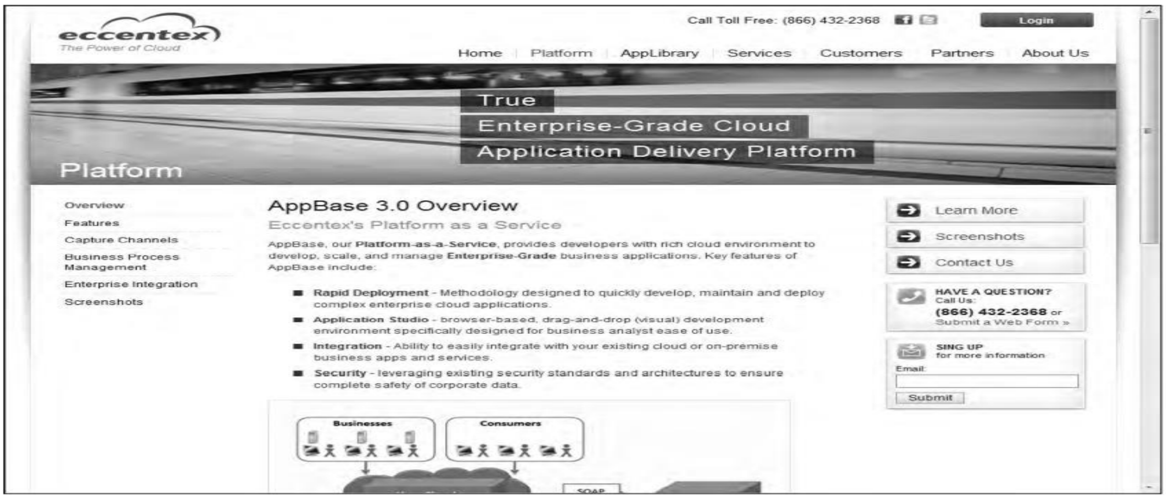
1. **Low-Code Development:**
   - AppBase 3.0 emphasizes a low-code approach, enabling developers to build applications with minimal hand-coding.
   - Visual development tools and drag-and-drop interfaces simplify the creation of workflows, forms, and business rules.
2. **Business Process Management (BPM):**
   - The platform includes robust BPM capabilities for modeling and automating business processes.
   - Users can define workflows, orchestrate tasks, and manage process lifecycles to streamline operations.
3. **Case Management:**
   - AppBase 3.0 supports case management solutions, allowing organizations to handle complex cases, incidents, or customer interactions efficiently.
   - Case data, documents, and communications can be managed within a unified environment.
4. **Integration Capabilities:**
   - Integration with third-party systems and data sources is facilitated through connectors and APIs.
   - AppBase supports RESTful APIs, SOAP services, and other integration methods for seamless data exchange.
5. **User Interface Customization:**
   - Developers can customize user interfaces (UIs) and user experiences (UX) to meet specific branding and usability requirements.
   - UI components, layouts, and themes can be modified without extensive coding.
6. **Security and Compliance:**
   - AppBase 3.0 includes built-in security features to protect data and applications.
   - Role-based access control (RBAC), encryption, and audit trails help maintain compliance with industry regulations (e.g., GDPR,

HIPAA).

7. **Analytics and Reporting:**
    - The platform offers tools for generating reports and analytics to gain insights into business processes and performance metrics.
    - Dashboards and visualizations help monitor key indicators and make informed decisions.
8. **Cloud Deployment and Scalability:**
    - AppBase 3.0 is designed for deployment in cloud environments, providing scalability and elasticity.
    - Organizations can scale applications based on demand and leverage cloud infrastructure benefits.

Use Cases for Eccentex AppBase 3.0:

- **Financial Services:** Implementing customer service portals, loan origination systems, and compliance management solutions.
- **Healthcare:** Managing patient cases, healthcare workflows, and electronic medical records (EMR) securely.
- **Government:** Automating citizen services, permit processing, and regulatory compliance workflows.
- **Insurance:** Claims processing, underwriting automation, and policy management applications.
- **Retail:** Customer support systems, order management, and inventory tracking solutions.



AppBase 3.0 Overview

Eccentex's Platform as a Service

AppBase, our **Platform-as-a-Service**, provides developers with rich cloud environment to develop, scale, and manage **Enterprise-Grade** business applications. Key features of AppBase include:

- **Rapid Deployment** - Methodology designed to quickly develop, maintain and deploy complex enterprise cloud applications.
- **Application Studio** - browser-based, drag-and-drop (visual) development environment specifically designed for business analyst ease of use.
- **Integration** - Ability to easily integrate with your existing cloud or on-premise business apps and services.
- **Security** - leveraging existing security standards and architectures to ensure complete safety of corporate data.

Fig 4.2 The Eccentex AppBase (http://www.eccentex.com/platform/platform.html) PaaS

4.1.4 Squarespace

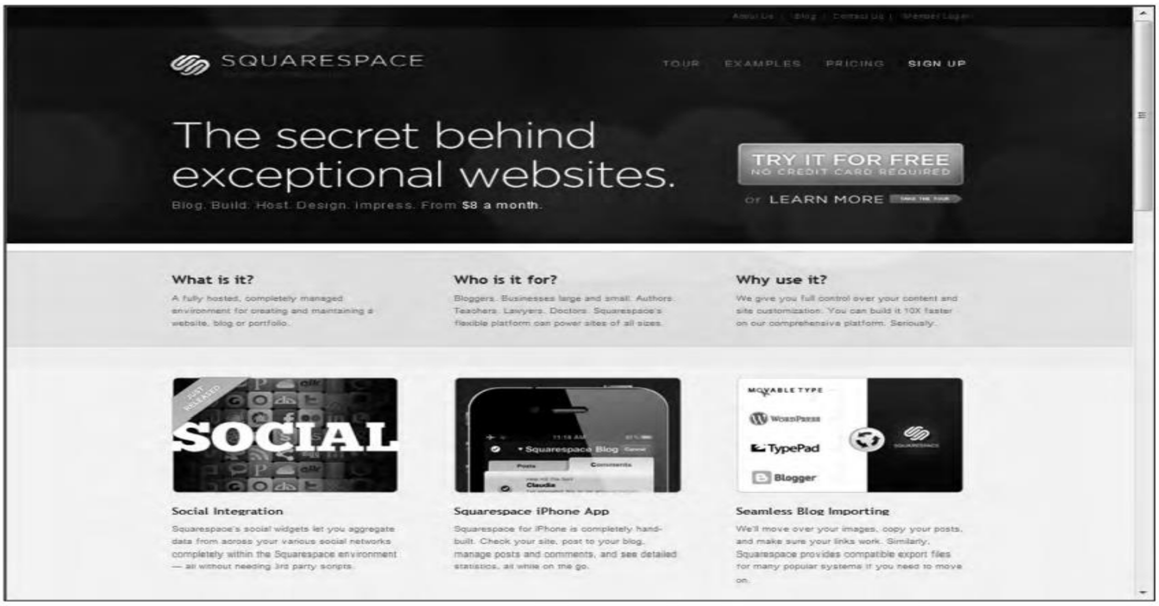
Squarespace is a popular all-in-one platform used for building and hosting websites, online stores, and blogs. It's known for its user-friendly interface, elegant design templates, and integrated features that simplify website creation and management. Here are some key aspects of Squarespace:

Key Features of Squarespace:

1. **Design Templates:**
    - Squarespace offers a collection of professionally designed templates that are responsive and mobile-friendly.
    - Users can customize templates with drag-and-drop functionality, adjusting layouts, fonts, colors, and more.
2. **Content Management:**
    - Easily create and manage content including pages, blogs, galleries, and portfolios.
    - Built-in content blocks for text, images, videos, forms, and social media

integration.

3. **E-commerce Capabilities:**
   - Squarespace supports online store functionality, allowing users to sell physical and digital products.
   - Features include product listings, inventory management, order processing, and secure checkout.
4. **SEO and Marketing Tools:**
   - Tools for search engine optimization (SEO) to optimize site visibility in search engine results.
   - Built-in analytics to track website traffic, visitor behavior, and sales performance.
5. **Integrated Blogging:**
   - Create and manage blogs with features like scheduled posts, categories, tags, and commenting.
   - RSS syndication and integration with social media platforms.
6. **Domain and Hosting:**
   - Domain registration and hosting are included with Squarespace plans, simplifying setup and management.
   - SSL security certificates are included to secure transactions and visitor data.
7. **Integration and Extensions:**
   - Integration with third-party services and extensions for additional functionality.
   - Examples include Google Workspace (formerly G Suite), Mailchimp, PayPal, and more.
8. **Customer Support:**
   - Squarespace provides customer support via email and live chat, with extensive documentation and community forums available.



The secret behind exceptional websites.

Blog. Build. Host. Design. Impress. From $8 a month.

What is it?

A fully hosted, completely managed environment for creating and maintaining a website, blog or portfolio.

Who is it for?

Bloggers. Businesses large and small. Authors. Teachers. Lawyers. Doctors. Squarespace's flexible platform can power sites of all sizes.

Why use it?

We give you full control over your content and site customization. You can build it 10X faster on our comprehensive platform. Seriously.

Social Integration

Squarespace's social widgets let you aggregate data from across your various social networks completely within the Squarespace environment — all without needing 3rd party scripts.

Squarespace iPhone App

Squarespace for iPhone is completely hand-built. Check your site, post to your blog, manage posts and comments, and see detailed statistics, all while on the go.

Seamless Blog Importing

We'll move over your images, copy your posts, and make sure your links work. Similarly, Squarespace provides compatible export files for many popular systems if you need to move on.

Fig 4.5 Squarespace lets you create beautiful hosted Web sites with a variety of capabilities with visual tools alone.

4.1.5 WaveMaker WaveMaker (http://www.wavemaker.com/) WaveMaker is a low-code platform that facilitates rapid application development (RAD) for building enterprise-grade web and mobile applications. It provides developers with tools to accelerate the development process, integrate with existing systems, and deploy applications efficiently. Here’s an overview of WaveMaker:

Key Features of WaveMaker:

1. **Low-Code Development:**
   - WaveMaker emphasizes a visual, drag-and-drop approach to app development, reducing the need for manual coding.
   - Developers can build applications using pre-built templates, components, and reusable modules.
2. **Responsive Design:**
   - Applications built on WaveMaker are responsive and adaptive to various screen sizes and devices.
   - Design elements and layouts can be customized to enhance user experience across desktops, tablets, and smartphones.
3. **Integration Capabilities:**
   - WaveMaker supports integration with various databases, APIs, and third-party systems.
   - Connectors and data binding tools simplify integration with enterprise systems like ERP, CRM, and other legacy applications.
4. **Security and Compliance:**
   - Built-in security features ensure application data and transactions are protected.
   - Compliance with industry standards and regulations (e.g., GDPR, HIPAA) is supported through customizable security policies.
5. **Deployment Flexibility:**
   - Applications developed on WaveMaker can be deployed on-premises or in the cloud (public, private, or hybrid environments).
   - Support for containerization (e.g., Docker) and Kubernetes orchestration enhances scalability and portability.
6. **Enterprise-Grade Features:**
   - WaveMaker includes features for business process automation (BPA) and workflow management.
   - Role-based access control (RBAC), auditing, and version control ensure governance and collaboration.
7. **Analytics and Reporting:**
   - Built-in analytics tools provide insights into application performance, user behavior, and business metrics.
   - Reporting capabilities allow users to create and customize reports based on data collected within the application.
8. **DevOps and CI/CD Integration:**
   - WaveMaker supports DevOps practices with features for continuous integration and delivery (CI/CD).
   - Automate build, test, and deployment processes to streamline application lifecycle management.

Eliminating Web Development Complexity | WaveMaker - Internet Explorer, optimized for Bing and MSN
http://www.wavemaker.com/
Bing
File
Edit
View
Favorites
Tools
Help
Favorites
Eliminating Web Development Complexity | Wave...
Page
Safety
Tools
WaveMaker
Download | Cloud | Contact
Search
Go
Product
Solutions
Customers
Partners
Company
News & Events
COMMUNITY
"WaveMaker is Powerbuilder for the Enterprise Web"
- Judith Hurwitz, Hurwitz & Associates
EmployeeApp – Main (Home)
http://localhost:8094/wavemaker/
File
Edit
View
Insert
Page
Services
Canvas
Source
Palette
Model
Common Widgets
Button
Rounded
DataGrid
WaveMaker
Download
WaveMaker
Watch
Screencasts
Explore
Application Gallery & Demos
Join
Our Developer Community
Upcoming Events

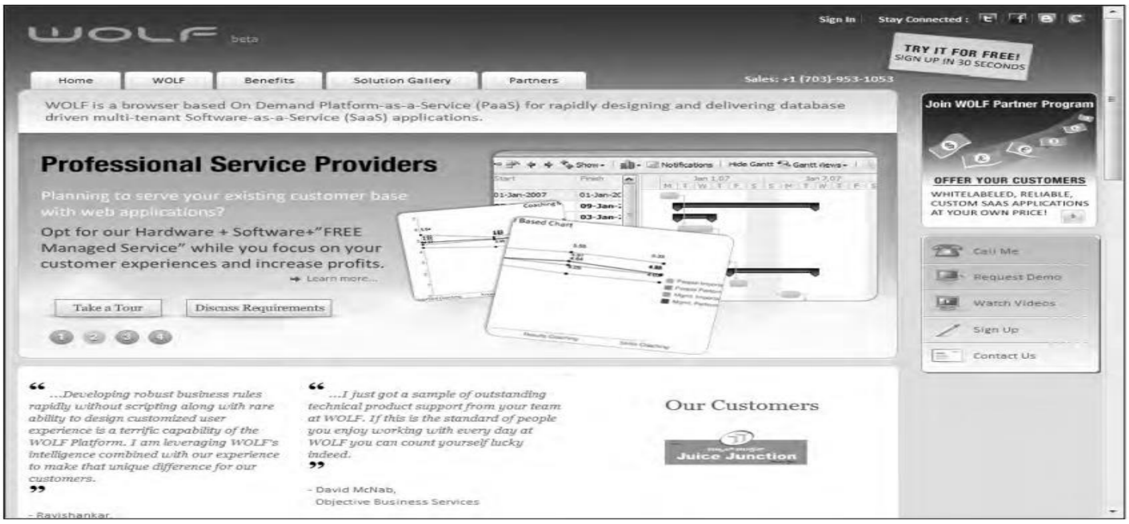
Fig 4.6 WaveMaker is a visual development environment for creating Java-based cloud applications.

4.1.6 Wolf Frameworks

Wolf Frameworks is an open-source web application framework designed for building PHP-based applications. It emphasizes simplicity, modularity, and flexibility, aiming to streamline the development process and provide developers with the tools necessary to create robust web applications. Here's an overview of Wolf Frameworks:

Key Features of Wolf Frameworks:

1. **Modular Architecture:**
   - Wolf Frameworks follows a modular approach, allowing developers to organize code into reusable modules.
   - Modules can encapsulate specific functionality, making it easier to manage and extend applications.
2. **MVC Pattern:**
   - The framework adheres to the Model-View-Controller (MVC) architectural pattern.
   - Separation of concerns enables developers to maintain clean, structured code and enhance application scalability.
3. **Database Abstraction Layer:**
   - Wolf Frameworks provides a database abstraction layer that supports multiple database management systems (DBMS).
   - Developers can interact with databases using object-relational mapping (ORM) or raw SQL queries as per application requirements.
4. **Template Engine:**
   - A built-in template engine facilitates the separation of presentation and business logic.
   - Developers can create and reuse templates to generate dynamic content efficiently.
5. **RESTful API Support:**
   - The framework supports the development of RESTful APIs (Application Programming Interfaces) for building web services.
   - API endpoints can be defined to expose application functionality and interact with external clients.
6. **Security Features:**
   - Wolf Frameworks includes features for handling authentication, authorization, and data validation.
   - Protection against common security threats like SQL injection and cross-site scripting (XSS) is integrated into the framework.
7. **Form Handling and Validation:**
   - Built-in form handling capabilities simplify the creation and validation of HTML forms.
   - Form data can be processed securely and validated on the server-side before submission.
8. **Extensibility and Customization:**
   - Developers can extend Wolf Frameworks functionality by creating custom modules or integrating third-party libraries.
   - Configuration options allow customization of application settings and behavior.



WOLF is a browser based On Demand Platform-as-a-Service (PaaS) for rapidly designing and delivering database driven multi-tenant Software-as-a-Service (SaaS) applications.

Professional Service Providers

Planning to serve your existing customer base with web applications?

Opt for our Hardware + Software+"FREE Managed Service" while you focus on your customer experiences and increase profits.

→ Learn more...

OFFER YOUR CUSTOMERS WHITELABELED, RELIABLE, CUSTOM SAAS APPLICATIONS AT YOUR OWN PRICE!

"...Developing robust business rules rapidly without scripting along with rare ability to design customized user experience is a terrific capability of the WOLF Platform. I am leveraging WOLF's intelligence combined with our experience to make that unique difference for our customers."

- Ravishankar,

"...I just got a sample of outstanding technical product support from your team at WOLF. If this is the standard of people you enjoy working with every day at WOLF you can count yourself lucky indeed."

- David McNab,
Objective Business Services

Our Customers

Fig 4.7 Wolf Frameworks offers an open platform based on SOA standards for building portable SaaS solutions.

Figure 4.8 shows the WOLF platform architecture.

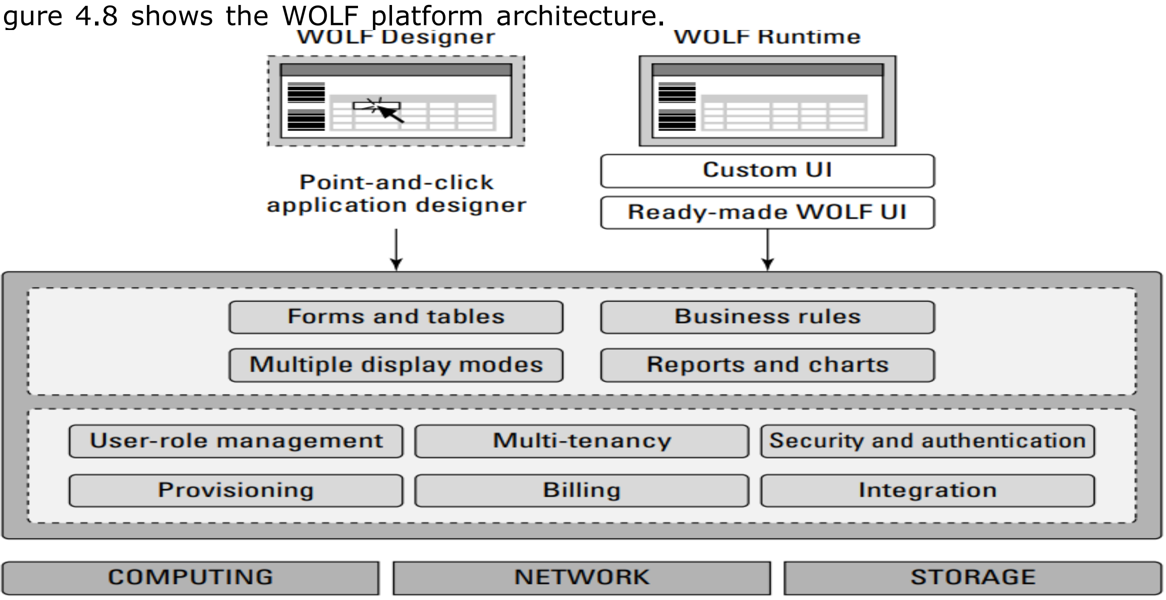


Fig 4.8 The Wolf platform architecture; source:http://www.wolfframeworks.com/platform.asp.

4.2 Exploring Platform as a Service Using Google Web Services

Platform as a Service (PaaS) using Google Web Services refers to utilizing Google Cloud Platform (GCP) offerings that enable developers to build, deploy, and manage applications without managing the underlying infrastructure. Here's an exploration focusing on key Google Web Services for PaaS:

Key Google Cloud Platform (GCP) PaaS Offerings:

1. **App Engine:**
   - **Description:** Fully managed serverless platform for building and deploying applications.
   - **Features:**
     - Auto-scaling and load balancing.
     - Support for multiple programming languages (Python, Java, Go, Node.js).

        - Datastore for NoSQL database needs.
        - Integration with other GCP services.
2. **Cloud Functions:**
    - **Description:** Event-driven serverless functions as a service (FaaS).
    - **Features:**
        - Execute functions in response to events (e.g., HTTP requests, Pub/Sub messages).
        - Support for Node.js, Python, Go, and more.
        - Pay-as-you-go pricing model.
3. **Cloud Run:**
    - **Description:** Managed compute platform for containerized applications.
    - **Features:**
        - Run containerized applications with automatic scaling.
        - Serverless, billed per request and resource consumption.
        - Integration with Kubernetes for more control (Cloud Run for Anthos).
4. **Firebase:**
    - **Description:** Platform for building mobile and web applications.
    - **Features:**
        - Real-time NoSQL database (Firestore).
        - Authentication services (Firebase Authentication).
        - Hosting with CDN (Firebase Hosting).
        - Analytics and performance monitoring.

Benefits of Using Google Web Services for PaaS:

- **Scalability:** Easily scale applications based on demand without managing infrastructure.
- **Flexibility:** Support for various programming languages, containers, and development workflows.
- **Integration:** Seamless integration with other Google Cloud services for data storage, analytics, machine learning, and more.
- **Serverless:** Focus on writing code and let Google manage infrastructure, ensuring high availability and reliability.
- **Security:** Built-in security features and compliance certifications (e.g., GDPR, HIPAA).

4.3 Exploring Platform as a Service Using Microsoft Cloud Services

Exploring Platform as a Service (PaaS) using Microsoft Cloud Services involves leveraging Microsoft Azure, which offers a robust set of PaaS solutions for building, deploying, and managing applications without the complexity of infrastructure management. Here’s an exploration focusing on key Microsoft Cloud Services for PaaS:

Microsoft Azure PaaS Offerings:

1. **Azure App Service:**
    - **Description:** Fully managed platform for building, deploying, and scaling web apps and APIs.
    - **Features:**
        - Support for multiple programming languages (.NET, Java, Node.js, Python, etc.).
        - Auto-scaling and load balancing.

        - Integration with Azure SQL Database, Azure Cosmos DB, and other data services.
        - DevOps integration with GitHub Actions, Azure DevOps, etc.
2. **Azure Functions:**
    - **Description:** Serverless compute service that allows developers to run event-driven code (functions) without managing infrastructure.
    - **Features:**
        - Execute code in response to triggers (HTTP requests, timer-based schedules, Azure services events).
        - Pay-per-use pricing model based on execution and resource consumption.
        - Supports multiple programming languages (C#, JavaScript, Python, etc.).
3. **Azure Kubernetes Service (AKS):**
    - **Description:** Managed Kubernetes container orchestration service for deploying, managing, and scaling containerized applications.
    - **Features:**
        - Automated provisioning, upgrading, and scaling of Kubernetes clusters.
        - Integration with Azure Monitor for monitoring and logging.
        - Seamless integration with Azure Active Directory (AAD) for authentication and authorization.
4. **Azure SQL Database:**
    - **Description:** Fully managed relational database service based on Microsoft SQL Server.
    - **Features:**
        - High availability with automatic backups and point-in-time restore.
        - Built-in intelligence for performance tuning and monitoring.
        - Options for scaling resources (compute and storage) based on workload demands.
5. **Azure Cosmos DB:**
    - **Description:** Globally distributed, multi-model database service for building highly responsive and scalable applications.
    - **Features:**
        - NoSQL database with support for multiple data models (document, key-value, graph, etc.).
        - Automatic scaling with guaranteed low-latency and high availability.
        - Multi-region replication and consistency levels for global distribution.
6. **Azure Active Directory (AAD):**
    - **Description:** Identity and access management service for securing applications and services.
    - **Features:**
        - Single sign-on (SSO) and multi-factor authentication (MFA) capabilities.
        - Integration with thousands of SaaS applications.
        - Conditional Access policies for controlling access based on user context and device compliance.

Benefits of Using Microsoft Cloud Services for PaaS:

- **Scalability and Flexibility:** Easily scale applications based on demand with built-in auto-scaling and flexible resource allocation.

- **Integration:** Seamless integration with other Microsoft services and third-party tools through Azure Marketplace.
- **Security:** Built-in security controls and compliance certifications (e.g., GDPR, HIPAA) for protecting data and applications.
- **Developer Productivity:** Focus on application development and innovation while Azure manages infrastructure operations.
- **Cost Efficiency:** Pay-as-you-go pricing model with options to optimize costs through resource scaling and management.

Use Cases for Microsoft Cloud Services PaaS:

- **Web Application Development:** Rapidly deploy and scale web applications using Azure App Service or AKS for containerized apps.
- **Serverless Architecture:** Implement event-driven applications and microservices with Azure Functions.
- **Data-Intensive Applications:** Utilize Azure SQL Database or Cosmos DB for storing and managing large volumes of data.
- **Integration and APIs:** Develop and expose APIs securely using Azure API Management and other PaaS offerings.

4.3.1 Exploring Microsoft Cloud Services

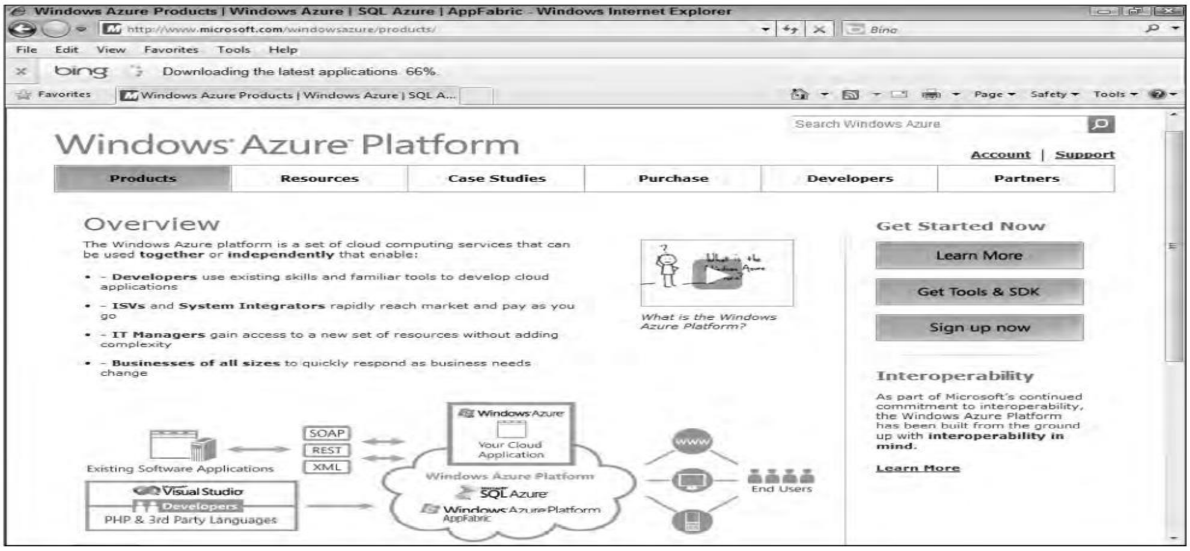
Exploring Microsoft Cloud Services encompasses a wide array of cloud computing offerings provided by Microsoft under the Azure platform. Here’s an overview of key Microsoft Cloud Services and their capabilities:

Key Microsoft Cloud Services:

1. **Azure Virtual Machines:**
   - **Description:** Infrastructure as a Service (IaaS) offering for deploying virtual servers on-demand.
   - **Features:**
     - Supports Windows and Linux virtual machines.
     - Flexible VM sizes and configurations.
     - Integration with Azure Backup and Azure Site Recovery for disaster recovery.
2. **Azure App Service:**
   - **Description:** Platform as a Service (PaaS) for building, deploying, and scaling web apps and APIs.
   - **Features:**
     - Supports multiple programming languages (C#, Java, Node.js, Python, etc.).
     - Auto-scaling, load balancing, and continuous deployment.
     - Integration with Azure SQL Database, Azure Cosmos DB, and other services.
3. **Azure Kubernetes Service (AKS):**
   - **Description:** Managed Kubernetes service for orchestrating containerized applications.
   - **Features:**
     - Simplified Kubernetes cluster management.
     - Auto-scaling, self-healing, and rolling updates.

        - Integration with Azure Monitor for container health monitoring.

4. **Azure Functions:**
    - **Description:** Serverless compute service for executing event-driven code.
    - **Features:**
        - Trigger-based execution (HTTP requests, timers, Azure services events).
        - Support for multiple languages (C#, JavaScript, Python, etc.).
        - Pay-as-you-go pricing based on execution and resources used.
5. **Azure SQL Database:**
    - **Description:** Fully managed relational database service based on SQL Server.
    - **Features:**
        - High availability, automated backups, and point-in-time restore.
        - Built-in intelligence for performance optimization.
        - Options for scaling compute and storage resources.
6. **Azure Active Directory (AAD):**
    - **Description:** Identity and access management service for securing applications and services.
    - **Features:**
        - Single sign-on (SSO) and multi-factor authentication (MFA).
        - Integration with thousands of SaaS applications.
        - Conditional Access policies and identity protection capabilities.
7. **Azure Cosmos DB:**
    - **Description:** Globally distributed, multi-model database service for NoSQL data.
    - **Features:**
        - Multiple data models (document, key-value, graph, etc.).
        - Guaranteed low-latency, high availability, and throughput.
        - Multi-region replication and elastic scalability.
8. **Azure DevOps:**
    - **Description:** Services for collaborative software development and DevOps practices.
    - **Features:**
        - Agile planning, version control, build and release management.
        - Continuous integration and continuous delivery (CI/CD) pipelines.
        - Integration with Azure services and third-party tools.



Windows Azure Products | Windows Azure | SQL Azure | AppFabric - Windows Internet Explorer
http://www.microsoft.com/windowsazure/products/
Bing
File Edit View Favorites Tools Help
bing
Downloading the latest applications 66%
Favorites
Windows Azure Products | Windows Azure | SQL A...
Page Safety Tools
Search Windows Azure
Windows Azure Platform
Account | Support
Products
Resources
Case Studies
Purchase
Developers
Partners
Get Started Now
Learn More
Get Tools & SDK
Sign up now
What is the Windows Azure Platform?
Existing Software Applications
SOAP
REST
XML
Windows Azure
Your Cloud Application
Windows Azure Platform
SQL Azure
Windows Azure Platform AppFabric
Visual Studio
Developers
PHP & 3rd Party Languages
www
End Users
Learn More

Overview

The Windows Azure platform is a set of cloud computing services that can be used **together** or **independently** that enable:

- – **Developers** use existing skills and familiar tools to develop cloud applications
- – **ISVs** and **System Integrators** rapidly reach market and pay as you go
- – **IT Managers** gain access to a new set of resources without adding complexity
- – **Businesses of all sizes** to quickly respond as business needs change

Interoperability

As part of Microsoft's continued commitment to interoperability, the Windows Azure Platform has been built from the ground up with **interoperability in mind.**

Fig 4.18 The integrated vision for application development and deployment with Azure is illustrated in this overview page of the Azure platform (http://www.microsoft.com/windowsazure/prod

4.3.2 Defining the Windows Azure Platform

The term "Windows Azure Platform" was previously used by Microsoft but has since been transitioned and rebranded under the umbrella of Microsoft Azure. Here's a definition and overview of what was historically known as the Windows Azure Platform and how it relates to Microsoft Azure today:

Windows Azure Platform (Historical Context):

1. **Windows Azure (Now Microsoft Azure):**
   - **Description:** Windows Azure was Microsoft's cloud computing platform that provided a range of cloud services for building, deploying, and managing applications and services through Microsoft data centers.
   - **Components:** It included services such as Azure Virtual Machines (IaaS), Azure App Services (PaaS), Azure SQL Database, Azure Storage, and more.
   - **Development Tools:** Supported development languages and frameworks included .NET, Java, Python, Node.js, etc.
   - **Deployment Models:** Offered options for both public and private cloud deployments, integrating with on-premises infrastructure.
2. **Transition to Microsoft Azure:**
   - **Rebranding and Evolution:** In 2014, Microsoft rebranded "Windows Azure" to "Microsoft Azure" to reflect its broadened scope beyond just Windows-based services.
   - **Expanded Services:** Microsoft Azure now encompasses a wider range of services, including infrastructure (IaaS), platform (PaaS), and software as a service (SaaS) offerings.
   - **Global Reach:** Available in multiple regions worldwide, with extensive compliance certifications and industry standards support.
   - **Integrated Ecosystem:** Seamlessly integrates with other Microsoft products like Office 365, Dynamics 365, and Azure DevOps for enhanced productivity and collaboration.

Microsoft Azure Today:

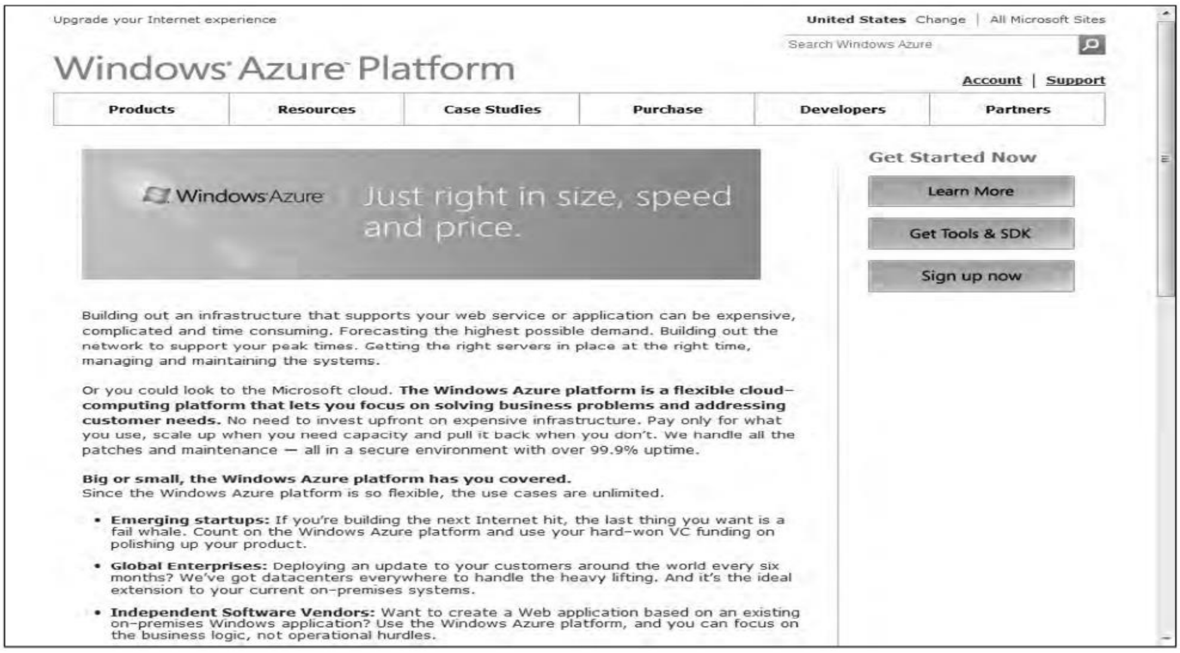
Microsoft Azure is a comprehensive cloud computing platform that offers:

- **Compute Services:** Virtual Machines, Azure Kubernetes Service (AKS), Azure Functions (serverless computing).
- **Data Services:** Azure SQL Database, Cosmos DB (NoSQL database), Azure Data Lake, Azure Synapse Analytics.

- **Networking:** Virtual Network, Azure Firewall, Azure CDN, Azure ExpressRoute.
- **AI and Machine Learning:** Azure Machine Learning, Cognitive Services.
- **Storage and Backup:** Azure Blob Storage, Azure Files, Azure Backup.
- **Identity and Security:** Azure Active Directory, Azure Key Vault, Azure Security Center.
- **Development and DevOps:** Azure DevOps, Azure Pipelines, Visual Studio integration.

Benefits of Microsoft Azure:

- **Scalability:** Easily scale applications and resources based on demand.
- **Flexibility:** Support for multiple operating systems, languages, frameworks, and tools.
- **Integration:** Seamlessly integrates with other Microsoft products and third-party services.
- **Security:** Built-in security controls, compliance certifications, and advanced threat protection.
- **Global Presence:** Extensive global network of data centers ensuring low latency and high availability.



Building out an infrastructure that supports your web service or application can be expensive, complicated and time consuming. Forecasting the highest possible demand. Building out the network to support your peak times. Getting the right servers in place at the right time, managing and maintaining the systems.

Or you could look to the Microsoft cloud. **The Windows Azure platform is a flexible cloud–computing platform that lets you focus on solving business problems and addressing customer needs.** No need to invest upfront on expensive infrastructure. Pay only for what you use, scale up when you need capacity and pull it back when you don't. We handle all the patches and maintenance — all in a secure environment with over 99.9% uptime.

Big or small, the Windows Azure platform has you covered.
Since the Windows Azure platform is so flexible, the use cases are unlimited.

- **Emerging startups:** If you're building the next Internet hit, the last thing you want is a fail whale. Count on the Windows Azure platform and use your hard–won VC funding on polishing up your product.
- **Global Enterprises:** Deploying an update to your customers around the world every six months? We've got datacenters everywhere to handle the heavy lifting. And it's the ideal extension to your current on–premises systems.
- **Independent Software Vendors:** Want to create a Web application based on an existing on–premises Windows application? Use the Windows Azure platform, and you can focus on the business logic, not operational hurdles.

Fig 4.18 Window Azure Platform's home page may be found at http://www.microsoft.com/ windowsazure, and is shown in this figure.

4.3.3 The software plus services approach Your computer is an AMI, which you are free to configure however you see fit. AWS facilitates deployments. Google's strategy with Google App Engine (GAE) is to provide a cloud-based development platform that can be used to add your software, as long as it can speak the Google App Engine API and make use of the App Engine framework's objects and properties.

.

4.3.4 The Azure Platform With Azure's architecture (shown in Figure 4.19), An application may be used both locally and remotely, or it may run in both environments. Azure apps can be used as apps, as services or background operations, or as both. The Windows Azure service is an operating system that runs in the cloud and is housed in Microsoft data centers. It is represented by the oval in Figure 4.19.

4.3.5 The Windows Azure service Microsoft operates Windows Azure, a virtualized Windows infrastructure, across a number of datacenters worldwide. The dashed oval in Figure 4.19 denotes the section of the Windows Azure Platform that is

Azure itself, or the IaaS piece of the platform, which is seen in greater detail in Figure 4.20.

Six main elements are part of Windows Azure:

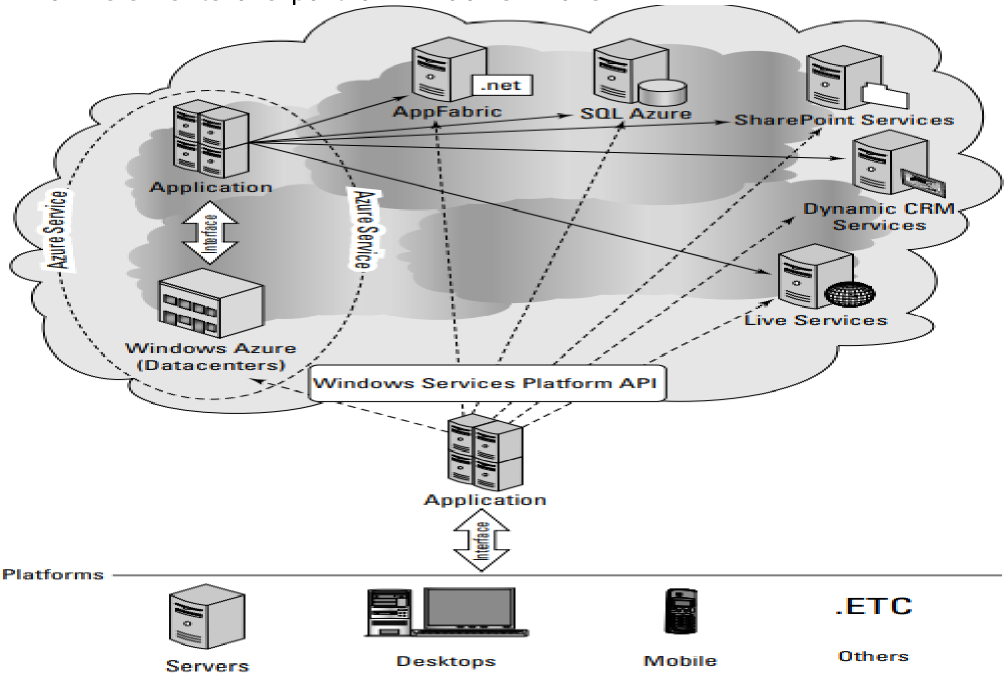


Fig 4.19 The Windows Azure Platform extends applications running on other platforms to the cloud using Microsoft infrastructure and a set of enterprise services.

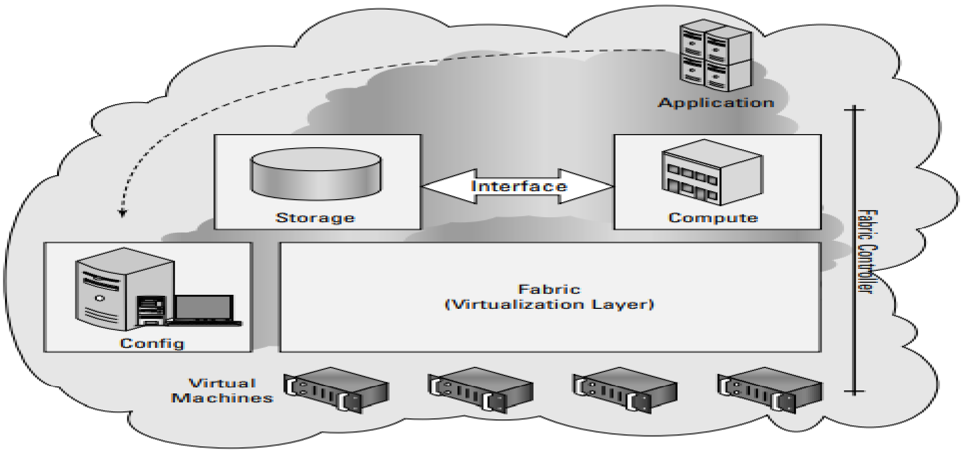
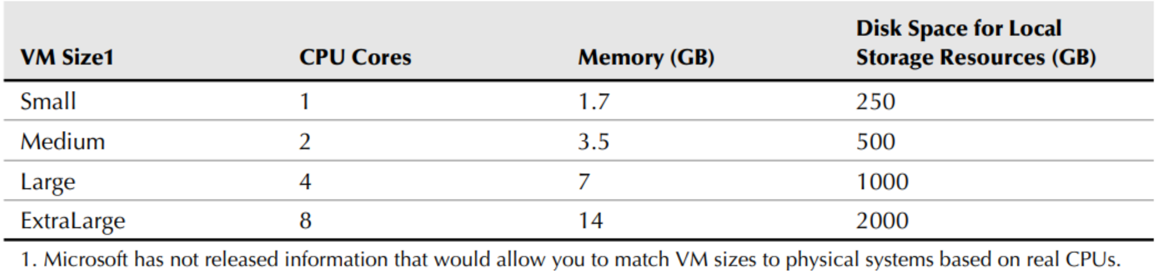


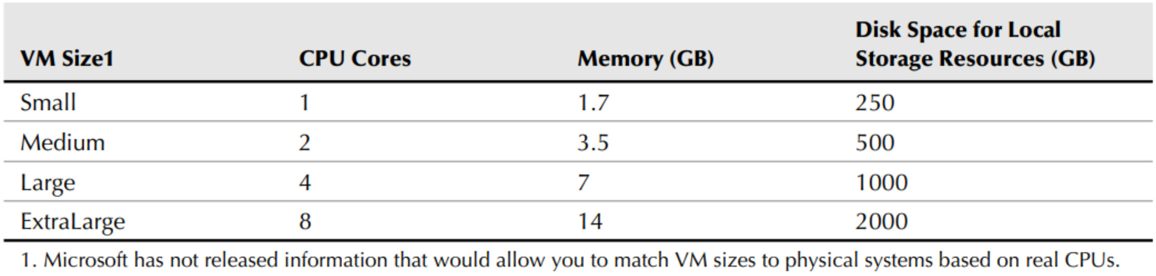
Fig 4.20 Windows Azure is a virtualized infrastructure that provides configurable virtual machines, independent storage, and a configuration interface.



VM Size1	CPU Cores	Memory (GB)	Disk Space for Local Storage Resources (GB)
Small	1	1.7	250
Medium	2	3.5	500
Large	4	7	1000
ExtraLarge	8	14	2000

1. Microsoft has not released information that would allow you to match VM sizes to physical systems based on real CPUs.

Table 4.3 Windows Azure Virtual Machine Sizes



VM Size1	CPU Cores	Memory (GB)	Disk Space for Local Storage Resources (GB)
Small	1	1.7	250
Medium	2	3.5	500
Large	4	7	1000
ExtraLarge	8	14	2000

1. Microsoft has not released information that would allow you to match VM sizes to physical systems based on real CPUs.

4.3.4 Windows Azure AppFabric

For client requests to Azure Web services, Azure AppFabric (http://msdn.microsoft.com/en-us/windowsazure/netservices. aspx) is a service bus and access control facility built on.NET technology. As seen in Figure 4.21, the purpose of a service bus in a service-oriented architecture (SOA) is to expose dispersed services as an endpoint from which customers can request services using a specified URI.

Azure AppFabric acts as an SOA service bus, as shown in Figure 4.21.

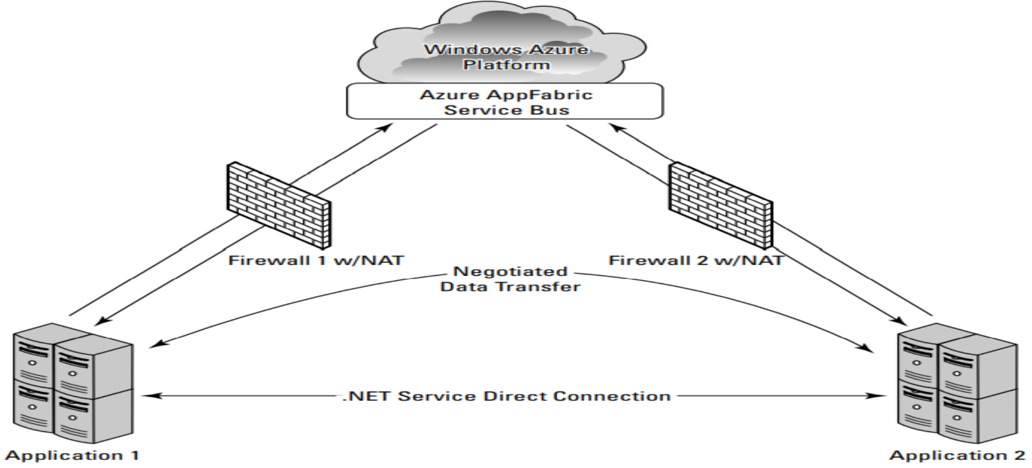


Fig 4.21 Azure AppFabric service pathways

An application or user, as shown on the right of Figure 4.22 presents a claim for a service from an application on the left.

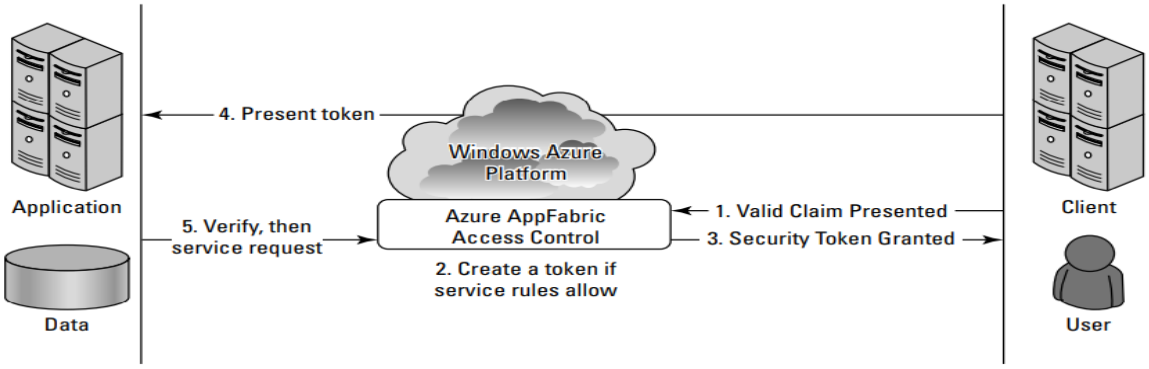

Application
Data
4. Present token
5. Verify, then service request
Windows Azure Platform
Azure AppFabric Access Control
2. Create a token if service rules allow
1. Valid Claim Presented
3. Security Token Granted
Client
User

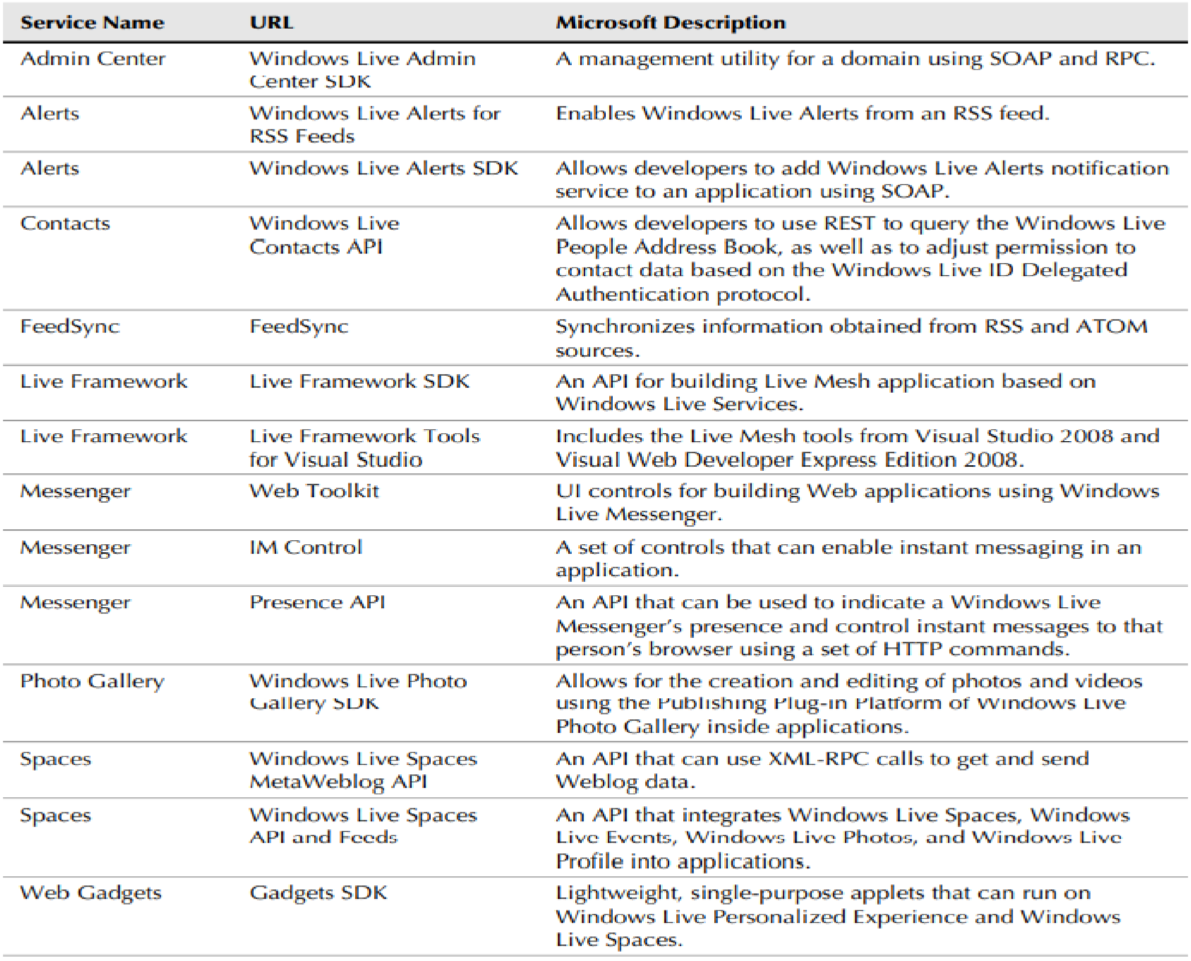
Fig 4.22 Azure AppFabric Access Control enables secure application requests through a token mechanism

4.3.5 Azure Content Delivery Network The global content caching and delivery solution for Windows is called the Windows Azure Content Delivery Network (CDN). The following URLs might be used by a user to view content located in a public container called "Box" under the storage account named "MyAccount":

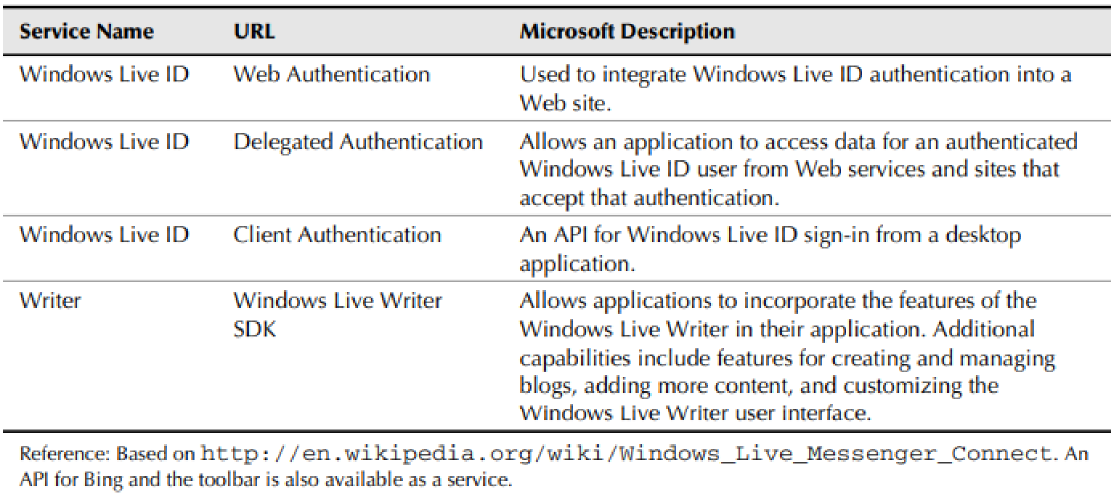
Windows Azure Blob services URL: http://.blob.core.windows. net//

Windows Azure CDN URL: http://.vo.msecnd.net//

4.3.6 SQL Azure Cloud-based relational database service SQL Azure is built on top of Microsoft SQL Server. SQL Server Data Service was the previous name of this service. On a PC, mobile device, or server running SQL Azure Database, an application can run locally that makes use of Windows Azure, a datacenter, or a server.



Service Name	URL	Microsoft Description
Admin Center	Windows Live Admin Center SDK	A management utility for a domain using SOAP and RPC.
Alerts	Windows Live Alerts for RSS Feeds	Enables Windows Live Alerts from an RSS feed.
Alerts	Windows Live Alerts SDK	Allows developers to add Windows Live Alerts notification service to an application using SOAP.
Contacts	Windows Live Contacts API	Allows developers to use REST to query the Windows Live People Address Book, as well as to adjust permission to contact data based on the Windows Live ID Delegated Authentication protocol.
FeedSync	FeedSync	Synchronizes information obtained from RSS and ATOM sources.
Live Framework	Live Framework SDK	An API for building Live Mesh application based on Windows Live Services.
Live Framework	Live Framework Tools for Visual Studio	Includes the Live Mesh tools from Visual Studio 2008 and Visual Web Developer Express Edition 2008.
Messenger	Web Toolkit	UI controls for building Web applications using Windows Live Messenger.
Messenger	IM Control	A set of controls that can enable instant messaging in an application.
Messenger	Presence API	An API that can be used to indicate a Windows Live Messenger's presence and control instant messages to that person's browser using a set of HTTP commands.
Photo Gallery	Windows Live Photo Gallery SDK	Allows for the creation and editing of photos and videos using the Publishing Plug-in Platform of Windows Live Photo Gallery inside applications.
Spaces	Windows Live Spaces MetaWeblog API	An API that can use XML-RPC calls to get and send Weblog data.
Spaces	Windows Live Spaces API and Feeds	An API that integrates Windows Live Spaces, Windows Live Events, Windows Live Photos, and Windows Live Profile into applications.
Web Gadgets	Gadgets SDK	Lightweight, single-purpose applets that can run on Windows Live Personalized Experience and Windows Live Spaces.



Service Name	URL	Microsoft Description
Windows Live ID	Web Authentication	Used to integrate Windows Live ID authentication into a Web site.
Windows Live ID	Delegated Authentication	Allows an application to access data for an authenticated Windows Live ID user from Web services and sites that accept that authentication.
Windows Live ID	Client Authentication	An API for Windows Live ID sign-in from a desktop application.
Writer	Windows Live Writer SDK	Allows applications to incorporate the features of the Windows Live Writer in their application. Additional capabilities include features for creating and managing blogs, adding more content, and customizing the Windows Live Writer user interface.

Reference: Based on `http://en.wikipedia.org/wiki/Windows_Live_Messenger_Connect`. An API for Bing and the toolbar is also available as a service.

Table 4.4. Windows live services