



Course Description

CTS1145 | Cloud Essentials | 4.00 credits

This course provides knowledge of Cloud computing concepts, services, architecture, system integration, connectivity, data center migration, administration, security, and technical support. Coverage includes preparation for the CompTIA Cloud Essentials certification examination.

Course Competencies:

Competency 1: The student will demonstrate an understanding of Cloud fundamentals by:

1. Describing Cloud computing, including its uses, properties and components
2. Describing the differences between machine virtualization and application containerization
3. Describing the NIST Cloud Computing Reference Architecture
4. Describing Cloud service models, including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), Anything as a Service (XaaS), and High-Performance Computing (HPC)
5. Describing Cloud deployment models including public, private, community, hybrid Cloud, federated Clouds, multi-clouds, and inter-clouds
6. Describing Cloud actors and their roles, including consumer, provider, auditor, broker, and carrier
7. Identifying the essential characteristics of Cloud services, including on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service

Competency 2: The student will demonstrate an understanding of Cloud services from a business perspective by:

1. Describing the differences between Cloud computing, outsourcing and virtualization and assessing their business benefits
2. Describing the business advantages and features of Cloud computing for enterprises
3. Describing the business advantages and features of Cloud computing for enterprises
4. Describing the types of organizations that benefit from Cloud computing
5. Describing the advantages and disadvantages of the different types of Cloud services, including IaaS, SaaS, PaaS, and XAAS
6. Describing the characteristics of Cloud computing that are advantageous to business enterprises including scalability, security, hardware independence, cost savings, time to market, and Internet distribution
7. Explaining the business considerations for migrating an enterprise to the Cloud
8. Describing issues associated with integrating Cloud services in a business, including regulatory compliance, service latency, privacy concerns, and risk management
9. Describing methods of maintaining strategic flexibility by using Cloud services
10. Describing the organizational capabilities relevant to realizing Cloud benefits, including adequate planning, required IT skills, gradual/staged migration pathways, identifying critical success factors, etc.
11. Propose a Cloud migration for a given organization, choosing a service and deployment model and recommending a pathway for Cloud adoption

Competency 3: The student will demonstrate an understanding of deployment solutions from the leading Cloud computing vendors by:

1. Identifying the major Cloud computing vendors and describing their products
2. Comparing and contrasting current Cloud platforms, including Amazon AWS, Red Hat Open Shift, Microsoft Azure, Google Cloud Compute, etc
3. Describing the roles and capabilities of Cloud computing vendors in providing solutions
4. Describing core services and their common use cases, as provided by common Cloud vendors, including compute, analytics, storage, database, virtual private Cloud, etc
5. Describing Cloud security and compliance infrastructure, including shared responsibility model,

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- access control and management, security compliance programs, and security resources
6. Describing the steps that lead to the successful adoption of Cloud computing based on a given Cloud platform vendor and the implications for organizations
 7. Describe the compliance, risk, and regulatory consequences of selecting a Cloud platform vendor
 8. Analyzing and recommending the best vendor solution for a given organization

Competency 4: The student will demonstrate an understanding of data center fundamentals by:

1. Describing the purpose of data centers, including data center types, architecture, service options, emerging delivery, and future demands
2. Describing data center components, including servers, switches, routers, firewalls, intrusion prevention and monitoring devices, data backup devices, etc
3. Describing data center facilities, including air conditioning/climate control systems, fire suppression/smoke detection, secured entry and access control, cabling structures, and water damage prevention
4. Describing data center design and operation, including hardware installation (placement of servers, racks, storage, networking devices, power, cabling), operating systems and software, virtualization, connectivity, peering, SANs, NAS, RAID, clustering, and offsite backup services
5. Describing data center best practices, including fault tolerance, high availability, data encryption and secure transit, regulatory compliance, redundancy, isolation, UPS and alternate power feeds, configuration management, multiple independent distribution pathways serving critical loads, compartmentalization of critical capacity components, systems autonomy, and security practices
6. Describing data center infrastructure management (DCIM) processes and solutions, including the software and hardware tools used to organize and manage resources
7. Describing the differences between traditional and Cloud data centers
8. Designing a data center for a given organization

Competency 5: The student will demonstrate an understanding of the technical aspects of Cloud computing by:

1. Describing Cloud infrastructure and architectural principles
2. Describing the difference between private and public types of Clouds from a technical perspective
3. Describing the techniques and methods for Cloud computing deployment, including networking, automation, self-service, federation, standardization, modeling and testing
4. Describing the technical challenges and risks of Cloud computing, including the following areas: Cloud storage, application performance, data integration, and security
5. Describing the impact of Cloud computing on application architecture and the application development process
6. Downloading and referencing technical documentation assistance, including manuals, whitepapers, support tickets, etc

Competency 6: The student will demonstrate an understanding of Cloud computing adoption and implementation by:

1. Describing the techniques and methods for Cloud computing deployment, including networking, automation and self-service, federation, the role of standardization
2. Describing multiple approaches for migrating applications
3. Describing the steps leading to a successful adoption of Cloud computing services, including selection criteria for a pilot, relating SaaS, PaaS, and IaaS deployment to organizational goals
4. Analyzing system requirements of a given organization to determine the appropriate structure, platforms, applications, services, tools, and Cloud and network components
5. Analyzing the requirements for a virtual network in a Cloud deployment, including sizing, subnetting, routing and switching components, port and protocol considerations, and network systems and services
6. Analyzing the appropriate storage types and protection capability for a Cloud deployment, including

throughput, availability, replication, redundancy, provisioning, management, and security

7. Installing a Cloud platform software development kit and running basic commands to initialize it
8. Creating, managing, and scaling a virtual server in a Cloud environment

Competency 7: The student will demonstrate an understanding of Cloud IT service management and support by:

1. Describing the impact of Cloud computing on IT service management, including service strategy, service design, service operation, and service transition
2. Describing the use of the Information Technology Infrastructure Library (ITIL) in managing Cloud computing
3. Perform a structured review based on ITIL to analyze the potential impact of a Cloud deployment for a given organization
4. Describing how scripting languages, such as Bash, Python, Java, C#, Ruby, and PowerShell, are used in Cloud computing.
5. Describing how ITIL configuration management tools (i.e., Puppet, Ansible, Chef, and Salt) are used to manage IT issues to ensure that a Cloud's state matches the state described in provisioning scripts
6. Writing and implementing basic scripts to perform Cloud configuration and testing
7. Describing Cloud management operations, including testing and validating Cloud deployment, analyzing usage patterns, monitoring performance, scaling resources, extending the scope of the Cloud, and managing accounts, authentication, and authorization
8. Describing Cloud maintenance operations including security patches, updating Cloud elements, and backup operations
9. Describing common Cloud issues and the recommended troubleshooting methodology

Competency 8: The student will demonstrate an understanding of workplace skills and professionalism by:

1. Describing the role of the Cloud technician in a business enterprise
2. Describing methods of logging incidents and reporting problem resolution
3. Presenting and following oral and written instructions
4. Demonstrating self-motivation and responsibility to complete an assigned task
5. Choosing appropriate actions in situations requiring effective time management
6. Applying principles and techniques for being a productive, contributing member of a team
7. Identifying and discussing intellectual property rights and licensing issues
8. Identifying and discussing issues contained within professional codes of conduct
9. Using appropriate communication skills, courtesy, manners, and dress in the workplace
10. Documenting problems and solutions in service reports and maintaining support records
11. Explaining the methods and best practices of interviewing business users to determine the symptoms and probable causes of system problems

Learning Outcomes:

- Communicate effectively using listening, speaking, reading, and writing skills
- Formulate strategies to locate, evaluate, and apply information
- Use computer and emerging technologies effectively