**CAD Phase 2**

**Project name:**

**3118-Disaster Recovery with IBM Cloud Virtual Servers**

**INNOVATION:**

In a rapidly evolving technological landscape, our assignment seeks to explore innovative solutions, including cutting-edge IBM technologies, that not only address current challenges but also anticipate future trends. By fostering creativity, embracing emerging technologies, and thinking beyond conventional boundaries, we aim to propose forward-looking strategies that can revolutionize the way we approach in Developing an effective disaster recovery strategy for critical business applications hosted on IBM Cloud virtual servers, ensuring minimal downtime and data loss in the event of unforeseen disasters Leveraging IBM's expertise and solutions, our goal is to not only meet expectations but to exceed them, pushing the boundaries of what is possible and inspiring a new era of Cloud Computing.

The Disaster Recovery site is being simulated using another VMware vCenter Server on IBM Cloud (VCS) with similar hardware. VMware Site Recovery Manager (SRM) is used to manage the Disaster Recovery of the VMs. SRM is expected to recover: • Network • VMs used as Nodes of the cluster • Storage Volumes.

• In addition to recovery of the VMs, the following Kubernetes state may need to be recovered if the distributed state gets corrupted. Therefore, it is a good practice to backup this state and restore it in the recovered VMs if needed. The backup and restore process is described in ICP Component Backup.

**High availability disaster recovery concepts:**

**Redundancy:** Redundancy involves having backup systems, components, or resources in place to take over in case of a failure. Redundancy can be implemented at various levels, including hardware (such as redundant servers), network.

**Load Balancing:** Load balancers distribute incoming network traffic across multiple servers or resources to ensure even distribution of workloads. This helps optimize resource utilization and provides redundancy by redirecting traffic away from failed servers.

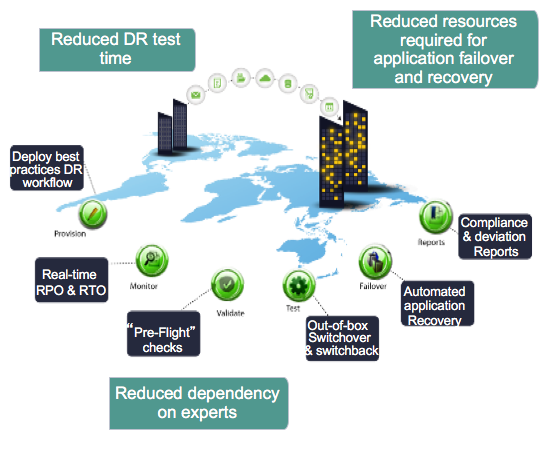
**RTO and RPO:** Recovery Time Objective (RTO) is the maximum allowable downtime for a system or application. Recovery Point Objective (RPO) is the maximum allowable data loss in case of a failure. These objectives help define the acceptable levels of downtime and data loss in a disaster recovery plan.

**Business Continuity Planning (BCP):** BCP is a broader concept that includes disaster recovery. It involves planning for the continued operation of critical business functions in the event of a disaster. Disaster recovery is one aspect of BCP.

**Cloud-Based Disaster Recovery Services:** Many cloud providers, including IBM Cloud, offer disaster recovery as a service (DRaaS). These services provide automated failover, data replication, and recovery capabilities in the cloud, reducing the need for on-premises infrastructure.

**IBM Cloud Resiliency Orchestration:**

IBM Cloud Resiliency Orchestration is a powerful platform designed to help organizations create, automate, and manage disaster recovery and resilience strategies for their critical business applications, including those hosted on IBM Cloud virtual servers.



**Disaster Recovery as a Service (DRaaS):**

* IBM Cloud DRaaS offers a managed disaster recovery solution where your virtual servers and data are replicated to a geographically separate IBM Cloud region. In the event of a disaster, failover is automated, and your applications can continue running from the secondary region with minimal data loss.

**Data Replication Services:**

IBM provides data replication services that can be tailored to your specific needs. Whether you require real-time synchronous replication for critical databases or near-real-time asynchronous replication for less critical data, IBM offers solutions that ensure data consistency and availability.

**IBM Cloud Object Storage:**

IBM Cloud Object Storage is a highly scalable and durable storage solution suitable for storing backup data. It provides data redundancy and can be integrated into your disaster recovery plan for secure data backups and archival storage.

**IBM Security Services:**

Security is paramount in disaster recovery. IBM Security Services can help you safeguard your data during failover and recovery processes. This includes ensuring secure access controls, encryption, and threat detection to protect against potential vulnerabilities.

**IBM Cloud Monitoring and Alerting:**

IBM Cloud provides robust monitoring and alerting capabilities to proactively detect anomalies and potential issues. Automated alerts can trigger predefined actions, such as initiating failover procedures, ensuring a swift response to disruptions.

**Continuous Testing and Improvement:**

Regularly testing your disaster recovery plan is crucial. IBM solutions emphasize the importance of conducting simulations and exercises to validate your strategy. Continuous testing helps identify weaknesses, improve recovery processes, and ensure that your plan remains up to date and effective.

**IBM Resilience Orchestration for VMware:**

if your virtualization environment is based on VMware, IBM offers a solution that is specifically designed to automate and orchestrate disaster recovery for VMware workloads hosted on IBM Cloud.

**Storage :**

This section provides information about a few storage solutions options.

**Actifio GO on IBM Cloud :**

Actifio GO on IBM Cloud is the next-generation, multi-cloud Copy Data Management SaaS solution that enables customers to back up enterprise workloads (VMware, Hyper-V, Physical Servers, SAP HANA, Oracle, SQL Server, and so on) directly to IBM Cloud while being able to instantly access the backup images within their data center.

**IBM Cloud Backup** :

IBM Cloud Backup is a full-featured, automated, and agent-based backup and recovery system that is managed through the IBM Cloud Backup Web CC browser utility. Its benefits include:

› Implement and monitor backup policies from anywhere by using a web-based GUI.

› Recover from more than one facility by using multi-vaulting capabilities.

› Scheduled backup with intelligent compression of data.

› End-to-end encryption with Deltapro Deduplication.

**IBM Cloud Object Storage :**

IBM Cloud Object Storage is a flexible, cost-effective, and scalable cloud storage for unstructured data. Its benefits include: › Less expensive because you can save costs that are related to server, power, and data center space requirements. › Streamlined storage environment for increased agility and reduced downtime. › Supports exponential data growth and built-in high-speed file transfer capabilities. › Enhanced data security with role-based policies and access permissions.

**Solutions**

A minimal and effective solution to the problem of developing a disaster recovery strategy for critical business applications hosted on IBM Cloud virtual servers are,

**Identify Critical Applications** in theBegin by the critical applications that need to be protected. These could include customer-facing systems, financial applications, and databases containing sensitive data.

**Define Recovery Objectives** by determine your recovery time objective (RTO) and recovery point objective (RPO) for each critical application. This sets the maximum allowable downtime and data loss in the event of a disaster.

**Leverage IBM Cloud Redundancy** by Deploying critical virtual servers in multiple IBM Cloud availability zones or regions to take advantage of inherent redundancy. This ensures that if one zone or region experiences issues, the application can continue running in another.

**Utilize Cloud Backup and Replication** by implementing regular backups of critical data to IBM Cloud Object Storage or another cloud storage solution. Set up data replication between primary and secondary cloud regions for near-real-time data synchronization.

**Automate Failover** can be managed byImplementing the automated failover scripts or use IBM Cloud automation tools to detect server or application failures and trigger failover to redundant resources. Automation reduces response time and minimizes manual intervention.

**Conclusion:**

In the ever-evolving landscape of technology and business, the importance of an effective disaster recovery strategy for critical applications on IBM Cloud virtual servers cannot be overstated. It transcends being merely a precautionary measure; it is the backbone of business resilience. With IBM Cloud's robust infrastructure and advanced capabilities, organizations can forge ahead with confidence, knowing that their critical applications are safeguarded against unforeseen disasters.

This strategy is more than a collection of processes; it's a testament to an organization's commitment to its customers and stakeholders. It is a pledge to maintain seamless operations, uphold data integrity, and ensure the highest levels of service even in the face of adversity. Through redundancy, automation, and rigorous testing, organizations can minimize downtime and data loss, assuring their customers that their needs will be met without interruption.

Moreover, this strategy represents adaptability in an ever-changing technological landscape. It's not a static plan but a dynamic blueprint that evolves with emerging threats and innovations. It underscores the organization's relentless pursuit of excellence, underlining that business continuity is not a mere aspiration but a steadfast promise.

In conclusion, the development of an effective disaster recovery strategy on IBM Cloud is not just a best practice; it's a commitment to unwavering service excellence, a testament to adaptability, and a symbol of trustworthiness. As organizations embark on this journey, they fortify themselves against the unexpected and, in doing so, fortify the trust they've built with their customers, partners, and the world. It is the embodiment of resilience, the foundation of success, and the assurance of continuity in an increasingly uncertain world.