Google Cloud

Course 1 resources and citations

Module 1: Introduction to cloud computing

Resources

Helpful resources and tips

- Google Docs Editors Help: Google Docs Help Center

- Google Docs Editors Help: Google Sheets Help Center

- Google Docs Editors Help: How to use Google Slides

- Hands-on labs overview

Google's trusted infrastructure

- Google Cloud: Google Infrastructure Security Design Overview

Cloud benefits and limitations

- Google Cloud: Advantages and Disadvantages of Cloud Computing

Serverless computing

- Google Cloud: Serverless

- Journal of Cloud Computing: Serverless computing: a security perspective

Citations

Composition of the cloud

- Cloud Flare. (n.d.) *What is latency? How to fix latency*.

- Google Cloud. (n.d.). *What is Cloud Storage?* Retrieved January 18, 2024.

- Google Cloud. (2023, September 1) *Building blocks of reliability in Google Cloud*.

- Think with Google. (n.d.). *Consumer insights: Mobile site abandonment after delayed load time*. Google.

Cloud deployment models

- Google Cloud. (n.d.). *What is Cloud Storage?* Retrieved January 18, 2024.

- Google cloud. (n.d.) *What is private cloud?* Retrieved January 18, 2024.

- IBM. (n.d.) *What is private cloud?*

Google's trusted infrastructure

- Google Cloud. (2022, September). *Default encryption at rest*.

Cloud benefits and considerations

- Google Cloud. (n.d.) *Advantages of cloud computing*.

- IBM. (n.d.) *What are the benefits of cloud computing?*

- Salesforce. (n.d.) *12 benefits of cloud computing*.

Cloud benefits and limitations

- Google Cloud. (n.d.). *What is cloud computing?*

Ephemerality and cloud resources

- Google Cloud. (n.d.) *The advantages of cloud computing*.

- Google Cloud. (n.d.) *Best practices for operating containers*.

- IBM. (n.d.) *What is cloud computing?*

Virtualization and virtual machines

- Google Cloud. (n.d.) *What is a virtual machine?*

- IBM. (n.d.) *What is virtualization?*

- Infosec Institute. (2012, December). *Virtualization security*.

- Scarfone, K. (2011, January) *Guide to security for all visualization technologies* (*Special Publication 800-125*). National Institute of Standards and Technology.

Serverless computing

- Google Cloud. (n.d.). *Cloud functions*.

- Google Cloud. (n.d.). *Serverless computing*.

- Jonas, E., Schleier-Smith, J., Sreekanti, V., Tsai, C.-C., Khandelwal, A., Pu, Q., Shankar, V., Carreira, J., Krauth, K., Yadwadkar, N., Gonzalez, J. E., Popa, R. A., Stoica, I., & Patterson, D. A. (2019, February 9). *Cloud programming simplified: A Berkeley view on serverless computing*. Cornell University.

Containerization

- Buchanan, I. (n.d.) *Containers vs. virtual machines*. Atlassian.

- Docker. (n.d.) *What is a container?*

- Google Cloud. (n.d.) *What are containers?*

- Intel. (n.d.) *Containers in the Cloud: An easier way to deploy workloads*.

Cloud storage benefits

- Huang, C., Huang, L., Qin, Z., Yuan, H., Zhou, L., Varadharajan, V., & Kuo, C. (2014, May 23). *Survey on securing data storage in the cloud*. *A*PSIPA Transactions on Signal and Information Processing, 3, e7.

- IBM. (n.d.) *What is cloud storage?*

- Jones, M. T. (2010). *Anatomy of a cloud storage infrastructure*. IBM developerWorks.

- Tahir, A., Chen, F., Khan, H. U., Ming, Z., Ahmad, A., Nazir, S., & Shafiq, M. (2020). A systematic review on cloud storage mechanisms concerning e-healthcare systems. *Sensors, 20(18), 5392*.

Types of storage in the cloud

- Google Cloud. (n.d.) *Buckets*.

- Google Cloud. (n.d.) *What is object storage?*

- Harris, J. (2014, February 26). Bridging the divide between unstructured and structured data. *Berkeley School of Information Blog*.

- IBM. (n.d.) *What is cloud storage?*

Google's storage options

- Google Cloud.(2024, January 17). *Storage classes*.

Module 2: Security in the cloud

Resources

Controls that contribute to security depth

- [Google Cloud: NIST Cybersecurity Framework & Google Cloud](#)

Platform as a service

- [Google Cloud: What is Platform as a Service (PaaS)?](#)

Firewalls for network security

- [Google Cloud: Network controls in GCP vs. on-premises: Not so different after all](#)

Citations

Cloud defense in depth

- Envid, I., & Kiner, E. (2019, June 20). [Google Cloud networking in depth: Three defense-in-depth principles for securing your environment](#). *Google Cloud Blog*.

- Google Cloud. (2023, August). [*Google security overview*](#) [Whitepaper].

- Mahalkari, A., Tailor, A., & Shukla, A. (2016). [Cloud computing security, defense in depth detailed survey](#). *International Journal of Computer Science and Information Technologies, 7(3), 1145-1151*.

- Zhang, K., & Somani, Z. (2022, August 26). [How to avoid cloud misconfigurations and move towards continuous compliance](#). *Google Cloud Blog*.

Controls that contribute to security depth

- Google Cloud. (2020, April). [*NIST Cybersecurity Framework & Google Cloud*](#) [Whitepaper].

The shared responsibility model

- Alvarenga, G. (2022, November 14). *Shared responsibility model*. CROWDSTRIKE.

- CloudPassage. (2020, August 26). Shared responsibility model explained. *Industry Insights Blog*.

- Google Cloud. (2023, August 21). *Share responsibility and shared fate on Google Cloud*.

- National Cyber Security Centre. (n.d.) *Cloud security guidance*.

- Oracle. (n.d.). *What is cloud security?*

Shared responsibility challenges

- CloudPassage. (2020, August 26). Shared responsibility model explained. *Industry Insights Blog*.

- Google Cloud. (2023, August 21). *Share responsibility and shared fate on Google Cloud*.

- Kaczorowski, M. (2019, March 29). Exploring container security: The shared responsibility model in GKE. *Google Cloud Blog*.

Shared responsibility and cloud migration

- Google Cloud. (2023, August 21). *Share responsibility and shared fate on Google Cloud*.

The shared fate model

- Chuvakin, A., & Rosenblatt, S. (2023, March 22). Lessons from the future: Why shared fate shows us a better cloud roadmap. *Google Cloud Blog*.

- Google Cloud. (2023, August 21). *Share responsibility and shared fate on Google Cloud*.

- Google Cloud. (2023, August 31). *Landing zone design in Google Cloud*.

An overview of IaaS, PaaS, and SaaS

- Cloudflare. (n.d.) *What is identity as a service?*

- Google Cloud. (n.d.). *PaaS vs IaaS: What's the difference?*

- Google Cloud. (n.d.). *What is IaaS?*

- Google Cloud. (n.d.). *What is PaaS?*

- Google Cloud. (2023, August 21). *Share responsibility and shared fate on Google Cloud*.

- National Cyber Security Centre. (n.d.). *Cloud security shared responsibility model*.

Infrastructure as a service

- Google Cloud. (n.d.). *What is IaaS?*

- Google Cloud. (2023, October 9). *Migrate to Google Cloud*.

- National Cyber Security Centre. (n.d.). *Cloud security shared responsibility model*.

Platform as a service

- Cloud Information Center. (n.d.). *Platform as a service (Paas)*.

- Google Cloud. (2023, August 21). *Share responsibility and shared fate on Google Cloud*

Software as a service

- Google Cloud. (n.d.). *Software as service (SaaS)*.

- Splunk. (2022, November 17) *Shadow it*.

IAM policies provide security depth

- Google Cloud. (2024, January 17). *IAM overview*.

- Google Cloud. (2024, January 17). *Use IAM Securely*.

- Okta. (2023, September 15). *What is LDAP & how does it work?*

- Red hat. (2022, June 3). *What is lightweight directory access protocol (LDAP) authentication?*

IAM in the cloud

- Google Cloud. (2023, August 8). *Manage identity and access*.

- Google Cloud. (2024, January 17). *Service accounts overview*.

- Google Cloud. (2024, January 17). *Workforce identity federation*.

Explore the Google Cloud console

- Google Cloud. (n.d.). *Cloud identity*.

- Google Cloud. (n.d.). *Cloud Identity* [Whitepaper].

- Google Cloud. (n.d.). *Google Cloud console*.

Networking fundamentals

- Eisenbud, D.E., Yi, C, Contavalli, C, Smith, C, Kononov, R., Mann-Hielscher E., Cilingiroglu, A., Cheyney, B., Shang, W & Hosein, J.D. (n.d.). *Maglev: A fast and reliable software network load balancer*. Google Inc., UCLA, SpaceX.

- Google Cloud. (2024, January 17). *Cloud Load Balancing overview*.

- VMware. (n.d.). *What is software-defined networking (Sdn)?*

Firewalls for network security

- Google Cloud. (2024, January 17) *VPC firewall rules*.

- Palo Alto Networks. (n.d.) *What is a firewall as a service?*

- Palo Alto Networks. (n.d.) *What is firewall as a service? What is a public cloud firewall?*

Key concepts of virtual private clouds

- Cloudflare. (n.d.) *What is a virtual private cloud (VPC)?*

- IBM. (n.d.). *What is a virtual private cloud (VPC)?*.

- Kuehler, J & Mollison, G. (2018, October 3). Network controls in GCP vs. on-premises: Not so different after all. *Google Cloud Blog*.

- Palo Alto Networks. (n.d.). *What is network segmentation?*

Module 3: The security lifecycle

Resources

Terraform as an IaC tool

- HashiCorp: Resource Blocks

Citations

An overview of DevSecOps

- Buchanan, I. (n.d.). History of Devops. Atlassian.

- Cloud Security Alliance. (n.d.). Devsecops.

- Sanders, G., Morrow, T., Richmond, N., & Woody, C. (2021). *Integrating zero trust and DevSecOps* [White paper]. Carnegie Mellon University, pp. 1-37.

- Software Engineering Institute. (n.d.). *DevSecOps*. Carnegie Mellon University.

- Synopsys. (n.d.). *DevSecOps*.

DevSecOps in action

- Department of Defense. (2021, September). *DevSecOps fundamental guidebook: DevSecOps tools & activities*.

- Sanders, G., Morrow, T., Richmond, N., & Woody, C. (2021, July). *Integrating zero trust and DevSecOps* [White paper]. Carnegie Mellon University.

Software pipelines

- Lucidchart. (2017, November 2). *The pros and cons of waterfall methodology*.

- Red Hat. (2022, May 11) *What is a CI/CD pipeline?*

- Synopsys Editorial Team. (2017, March 27). Top 4 software development methodologies. *Synopsys blog*.

The CI/CD pipeline

- Amazon Web Services. (n.d.). *What is continuous delivery?*

- Gitlab. (n.d.) *What is CI/CD?*

- Google Cloud. (n.d.). *DevOps capabilities*.

- Palo Alto Networks. (n.d.) *What is the CI/CD pipeline?*

- Red Hat. (2022, May 11) *What is a CI/CD pipeline?*

Software pipelines and Google's Cloud Build

- Google Cloud. (2024, January 17). *Overview of Cloud Build*.

Introduction to the software supply chain

- Google Cloud. (2024, January 17) *Software supply chain security*.

- Schmitt, J. (2023, June 26). Software supply chain: What it is and how to keep it secure. *CircleCI Blog*.

- Temple-Raston, D. (2021, April 16). *A "worst nightmare" cyberattack: The untold story of the solarwinds hack*. NPR.

- Williams, J. (2020, December 15). What you need to know about the solarwinds supply-chain attack. *SANS Institute Blog*.

Levels of the software supply chain

- Google Cloud. (2024, January 17) *Artifact Registry overview*.

- Google Cloud. (2024, January 22) *Software supply chain threats*.

- SLSA. (n.d.). *SLSA specification*.

Strengthen the supply chain with Software Delivery Shield

- Google Cloud. (n.d.). *Software delivery shield*.

- Google Cloud. (2024, January 17). *Overview of Assured Open Source Software*.

- McGrath, M. (2022, October 11). Software Delivery Shield protects the software supply chain. *Google Cloud Blog*.

Infrastructure as code (IaC) in the cloud

- Gitlab. (n.d.) *What does infrastructure as code mean?*

- Klein, J., & Reynolds, D. (2018). *Infrastructure as code–Final report*. Carnegie Mellon University.

- Kumara, I., Garriga, M., Romeu, A. U., Di Nucci, D., Palomba, F., Tamburri, D. A., & Van Den Heuvel, W. (2021). *The do's and don'ts of infrastructure code: A systematic gray literature review*. Information & Software Technology.

- Palo Alto. (n.d.) *What is IaC security?*

An overview of policy as code

- HashiCorp. (n.d.) *Policy as code*.

- Palo Alto. (n.d.) *What is Policy as Code?*

- Synopsys. (n.d.). *Policy-as-code*.

- Zhang, X. (2023, April 7). *Realize policy-as-code with Pulumi through CrossGuard on Google Cloud*. *Google Cloud Blog*.

Terraform as an IaC tool

- Google Cloud. (2024, January 17). *Deploy a basic Flask web server by using Terraform*.

- Hashicorp. (n.d.). *What Is Infrastructure as Code with Terraform?*

IaC in the GitOps framework

- Gitlab. (n.d.) *Merge requests*.

- Gitlab. (n.d.) *What is GitOps?*

- Neytchev, J. (n.d.) *GitOps with Prisma Cloud Code Security*. Palo Alto.

- Red Hat. (2023, March 10). *What is GitOps?*

- Weaveworks (2021, July 13) *The history of GitOps*.

Module 4: Cloud security analyst roles and responsibilities

Resources

Useful Google Cloud tools

- Google Cloud: Cloud Functions documentation

- Google Cloud: Cloud Identity

- Google Cloud: Cloud Shell documentation

- Google Cloud: Compute Engine documentation

- Google Workspace: How teams of all sizes connect, create, and collaborate

Introduction to artificial intelligence

- Google Cloud: Generative AI examples

- Google Cloud: Introduction to Generative AI

Guide to Virtual Private Cloud (VPC)

- Google Cloud: gcloud compute networks

Citations

Introduction to the cloud security analyst's role

- CompTIA. (2022, October). *Complete Guide to IT Risk Management*.

- Cyber Threat Intelligence team. (n.d.). What is cyber threat intelligence? *CIS*.

- National Institute of Standards and Technology. (2023, November 7). *NIST Risk Management Framework*.

Cloud security analyst job responsibilities

- Google Cloud. (2024, January 18). *Security Command Center overview*.

Core cloud security analyst responsibilities

- Kumar, A., Umurzoqovich, R. S., Duong, N. D., Kanani, P., Kuppusamy, A., Praneesh, M., & Hieu, M. N. (2022, November). An intrusion identification and prevention for cloud computing: From the perspective of deep learning. *Optik, 270, 170044*.

The security ecosystem

- Google cloud. (n.d.). *Professional Cloud Security Engineer*.

- Haller, K. (2022, May 18). *A cloud security architect's to-do list*. Data Center Knowledge.

- Palo Alto Networks. (n.d.). *Cloud security is a shared responsibility*.

- Strategy of Security. (n.d.). *Cybersecurity ecosystem*.

Communicate with stakeholders

- Giallonardo, R. (2019, February 22). Privacy and security in cloud computing. *Medium*.

- National Institute of Standards and Technology. (n.d.). *Stakeholder*. Computer Security Resource Center.

Core skills for cloud cybersecurity analysts

- Cybersecurity Guide Contributors. (2023, October 23). *Become a security analyst: Skills and steps*. Cybersecurity guide.

Common tools in the cloud analyst's toolkits

- Cloud Identity Help. (n.d.). *View VirusTotal reports from the investigation tool*. Google.

- CompTIA. (n.d.). *What is Wireshark and how is it used?*

- Google. (n.d.). *reCaptcha: Tough on bots easy on humans*.

- Hashicorp (n.d.). *Terraform*.

- Lucidchart. (2018, July 17). *Improving your organization's web security testing*.

Introduction to artificial intelligence

- Google Cloud. (n.d.). *What is artificial intelligence (AI)?*

- Google Cloud. (n.d.). *What is machine learning (ML)?*

- Gupta, M., Akiri, C., Aryal, K., Parker, E., & Praharaj, L. (2023, August 1). *From ChatGPT to ThreatGPT: Impact of generative AI in cybersecurity and privacy*. *IEEE Access, 11, 80218–80245*.

Cloud Shell overview

- Google Cloud. (n.d.). *Cloud shell*.

- Google Cloud. (2023, December 6). *gcloud compute networks subnets create*.

- Google Cloud. (2024, January 17). *Cloud code for cloud shell limitations and restrictions*.

- Google Cloud. (2024, January 18). *gcloud CLI overview*.

Guide to Virtual Private Cloud (VPC)

- Google Cloud. (2023, October). *Global, regional, and zonal resources*.

- Google Cloud. (2023, November). *Virtual Private Cloud (VPC) overview*.