Google Interview Preparation

**Role-Related Knowledge**

* **IaaS/PaaS**
  + What is it? PaaS (Platform as a Service) – runs the infrastructure while you can focus on the code with the preset options. IaaS (Infrastructure as a Service) – provides raw storage, compute to provision resources in a specific environment.
  + Components? Traditional On-Premises, IaaS, PaaS, SaaS - https://www.episerver.com/learn/resources/blog/fred-bals/pizza-as-a-service/
  + How does it work?
    - Traditional is pizza made at home. You supply all the infrastructure with all the related costs
    - IaaS is like a take & Bake pizza. All the core is provided. You take it and bake it.
    - PaaS is pizza already made and delivered to you. All you have to do is eat it.
      * App Engine
    - SaaS is going to another place and eating the pizza.
  + Use Cases? Cloud Platforms/SalesForce/AppFog/ ElasticBeanstalk/App Engine
* **Infrastructure Automation Tools**
  + What is it? It is an agentless configuration management tool. Provides a simplify and managed large-scale infrastructure efficiently and with minimal effort from developers and operators.
  + Components? Chef/Puppet/Ansible – Chef is an internal Ruby DSL (Domain-Specific Languague) for scripting environments. Puppet is an external DSL. Used mainly for Linux but use Windows as well. Get the same result from both.
  + How does it work? <https://www.ibm.com/developerworks/library/a-devops2/>
    - Chef servers contain configuration data for managing multiple nodes. Configuration files are pulled down by the server as requested.
      * Users interact with the server with knife (used to communicate between nodes)
      * Chef runs cookbooks consist of recipes that perform automated steps on nodes
      * Recipes in a node(run chef client) are called a run list.
      * Can run across many nodes
      * Chef workstation is an instance with a local Chef repository and knife.
    - Puppet
      * Master centralizes the configuration among nodes and groups them together based on type.
      * Agent runs as a daemon on systems. Deploys infrastructure changes.
      * Facter – holds metadata about the system and can be used to filter among servers.
      * MCollective is a deployment tool that integrates with Puppet.
  + When would you use it or not? (Pro’s/Cons’). Used mainly to do infrastructure as code. Not used to deploy applications
  + Use Cases? Wanting to deploy multiple servers or configure them all at once.
* **System Architecture**
  + What is it? System architecture is a conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system.
  + Components?
    - RAD – JAD, CASE, Prototyping
    - Prototyping – build a scaled-down version of a desired system
    - CASE – software tools to develop information systems
    - JAD – process of collecting information system requirements and reviewing system designs
    - SDLC – Systems, Planning, Selection, System Analysis, Systems Design (logical/physical), System implementation, and operation.
    - Agile Methodologies
  + How does it work?
  + Use Cases?
* **Big Data Analytic Tools**
  + What is it? They help uncover hidden patterns, unknown correlations, and other useful business information. Volume, Variety, Velocity
  + Components?
    - Hadoop – framework for distributed process of data sets across clusters of computers using simple programming models.
    - Cloudera
    - MongoDB
    - Hive - data warehouse infrastructure that provides data summarization and ad hoc querying.
    - Spark - A fast and general compute engine for Hadoop data. Spark provides a simple and expressive programming model that supports a wide range of applications, including ETL, machine learning, stream processing, and graph computation.
    - Tableau
  + How does it work?
  + Use Cases?
* **Networking**
  + What is it? It is the construction, design, and use of a network, including the physical cabling, the selection, and use of telecommunication protocol. Computer software for using and managing the network, and the establishment of operation policies and procedures.
  + Components?
    - OSI – Physical, Data Link, Network, Transport, Session Layer, Presentation, Application
    - **Switch** – stores the hardware or physical address for each device connected to its ports. Enables a switch to communicate directly to the devices without broadcasting.
    - Routers - used to connect two or more networks
    - Gateways - describe the address of the networking device that enables the hosts in a LAN to connect to networks and hosts outside the LAN.
    - NIC - electronic hardware interface to the LAN
    - AP - used to make the data connection to the ISP via cable or DSL modem. Way to connect wireless LANs to ISP access
    - Modem - provide highspeed data access via your cable connection or via a telephone company’s DSL connection
    - LAN/WAN - **LAN (Local Area Network)** – Network commonly used to accomplish this interconnection. Network users that share computer resources in a limited area. **Wide Area Network** – communication networks that span a large geographic area such across cities, states, or countries.
  + How does it work?
  + Use Cases?
* **Storage – File/Block** 
  + What is it? It’s a way to store data in a variety of ways to obtain information.
  + Components?
    - Block – data is handles in chunks/blocks
    - Object Storage - data is stored as objects in containers
    - Storage virtualization – consists of taking several physical storage devices and joining them to appear as one logical unit to manage.
    - NAS - appears as a file server with an IP address. Accessed over a network connection.
    - DAS - attached disk without any network in between. Can be individual disks, group of disks, attached to disk
    - SAN- block based storage system available over the network.
    - iSCSI – IP based storage access protocol. iSCSI initiator is a server that initiates iSCSI command. iSCSI targets are storage devices that are iSCSI enabled.
    - FC – HBA (host bus adapter) installed on each server. HBA’s connect the server directly to the storage system in a small environment. Can also be connected with a FC switch. Accelerate backup and restore, improve business continuance, boost HA, and storage consolidation
    - FCoE – FC protocol with 10 GB Ethernet. Eliminates the need for two different data centers.
    - NFS (Network File Server)
    - Snapshots – point in time copies or pointers
    - RAID 0 strips data across 2-3 disks with no parity for redundancy.
    - RAID 1 mirrors data across 2-3 disks. Fault tolerance
    - RAID 5 uses block level stripping with parity data distributed across all member disks and only needs 1 drive to be present to operate
    - RAID 10 is a strip of mirrors. Multiple raid 1 mirrors and a raid 0 strip is created over these.
  + How does it work?
  + Use Cases?
* **Open Source technologies**
  + What is it? They are software or technologies with source code that anyone can inspect, modify, utilize, or enhance.
  + Components?
    - Angular
    - **OpenShift** – container application platform bringing docker and kubernetes to enterprise.
    - MySQL
    - **OpenStack** – public/private cloud
    - **React** – javascript library to help make interactive UI’s.
    - Node.js
    - **Git** – repository that allows users to commit changes against a master repo and can be accepted by others. I utilize this all the time.
  + How does it work?
  + Use Cases?
* **Clustering**
  + What is it? It’s a group of servers and other resources that act like a single system and enable HA, load balancing and parallel processing.
  + Components?
    - **Active/Passive** – primary site remains active until something happens in which it failovers to the passive.
    - **Share No architecture** – cluster does not share any data within the network.
    - **Active/Active** – both sites are active and if something were to happen. It still remains active.
  + How does it work?
  + Use Cases?
* **Containers versus VM’s**
  + What is it? Containers are an abstraction at the app layer that packages code and dependencies together. Multiple containers can run on the same machine that share the OS kernel with other containers which are isolated. Take up less space. VM’s are an abstraction of physical hardware turning one server into many servers. The hypervisor allows multiple VM’s to run on a single machine. Each VM has a full copy of an OS. Slow to boot
  + Components?
    - **Docker Image** – basis of a docker container ISO. Read only. Base Build docker containers.
    - **Docker Container** – holds everything needed to make an application to work.
    - **Layers/Union File System** – Combines layer into a single image. Branches are separate file systems.
    - **Docker File** – instructions create or include each layer. Stored in a docker file.
    - **Docker Daemon/Engine** – create OS to run your applications. Communicates with the docker client to build/ship/run containers
    - **Docker Client** – interface between you and the engine. Control docker daemon
    - **Docker Registries /Docker Hub** – hold images in a repo. Provided by Docker Hub. Can use images based on what others have done.
    - **Kubernetes** – orchestration management of containers like docker swarm.
  + How does it work?
  + Use Cases?
* **Databases** 
  + What is it? It’s an organized collection of data. Several different types of Databases – RDBS, NoSQL, etc.
  + Components?
    - SQL – language. RDS
    - Access
    - NoSQL – JSON names spaces with unstructured data in a database type format.
  + How does it work?
  + Use Cases?
* **Information Security**
  + What is it? It’s a set of strategies for managing the processes, tools and policies necessary to prevent, detect, document and counter threats to digital and non-digital information
  + Components?
    - **CIA** – Confidentiality, Integrality, Availability
    - **Confidentiality** – people can’t read sensitive information on a computer or traveling across a network
    - **Integrity** – Integrity means that attackers cannot change or destroy information on a computer or across a network
    - **Availability** – people who are authorized to use information are not prevented from doing so
    - **Risk management**
    - **Defense in Depth** - attack has to break through multiple countermeasures to succeed. Vulnerability reporters find problems in nearly every security countermeasure
    - Access Control – RBAC.
    - **Cryptography** - use of mathematical operations to protect messages traveling between parties or stored on a computer.
    - **Authorization** - process of assessing the identity of each individual claiming to have permission to use a resource.
  + How does it work?
  + Use Cases?
* **IoT**
  + What is it? The latest trend in terms of the internet of things. Network of physical devices, vehicles, home appliances and other items embedded with electronics that exchange data.
  + Components? https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/
    - RF
    - Sensors - Use sensors to detect which areas in a showroom are the most popular, and where customers linger longest
    - Networks
    - Standard
  + How does it work?
  + Use Cases?
* **Hybrid Cloud/Cloud Migration**
  + What is it? It’s a cloud computing environment which uses a mix of on-premises, private cloud and third-party, public cloud services with orchestrations between the two platforms.
  + Components?
    - Public Cloud – available to any organization or on a play per use plan
    - Private Cloud – operated solely for one organization
    - Hybrid Cloud - 2 or more clouds that are separate or can be used in combination
    - On-Premise – CPE hardware the is utilized onsite
    - Colocation – renting space from another provider but housing your equipment within that DC.
    - Greenfield – build the new environment at the target site. Cutover with copy-based approach.
    - AB Testing – sends percentage of traffic to green/blue environment.
    - Single Target Deployment – Build at the target site fresh.
    - All-at-once deployment – One setup deployment with orchestration
    - Minimum in-service deployment – deployes as many targets as possible whiling maintaining the minimum.
    - Rolling deployment – Happens in multiple stages. Allows for testing. No downtime.
  + How does it work?
  + Use Cases?

**What is a VM and how does it work?**

A VM is an image that behaves like an actual computer. If you have seen inception, it’s kind of like that having a computer within a computer but provides the same experience to the end user. The VM is sandboxed from the main OS inside the computer. This provides an environment for testing applications, creating OS backups, etc. Virtualbox is a use case.

**What is distributed computing?**

Distributed computing is a model in which components of a software system are shared among multiple computers to improve efficiency and performance. Example, 3-tier architecture using a user interface, business processing, and database access.

**What do you love about technology?**

My fascination with technology is its ability to make processes better or our lives better by fixing small problems that are pretty big in the scheme of things. Example: Thermostats.

**How have you been able to demonstrate a deeper understanding?**

I’ve been learning a lot about storage these last couple days. I knew a little bit about storage in the beginning and the basic concepts. I’ve come to have a deeper understanding around it. It’s interesting how read/write operations to disk are first storage in NVRAM and system memory and then written to disk. Others may think it’s just done automatically. Deeper understanding comes bit by bit but once it comes, it’s amazing.

**Teach me something fascinating about technology?**

SSD is a flash based storage drive. Did you know the slot that plugs into PCI is bottlenecked? NVMe(non-violate memory express) will be something up and coming here in the near future. NVMe solves this problem opening up the physical bottleneck straight to the CPU bus which allows for more read/write operations.

**Image you oversaw a company. What three things would you change and why?**

* **Employees**
* **Focus on customers**
* **CEO work along everyone else**

**If you were to design the server back-end system for X, how would you design it?**

I would evaluate the application first. I would look at it’s dependencies. What is the network structure like? I would then visio out a potential solution with server’s and how the network traffic will be flowing.

**How would you create/access YouTube Videos?**

I would look at the equipment I would like to use for the YouTube Video I’m looking to create. I would then look at the idea I want to capture in a video format – maybe need a script, personal purpose, etc. I would then start to make the video, making sure there was enough light, sound was clear, video is crisp. During the video, I want to make sure I’m speaking loudly, clear. I would then edit and transfer the video. I would then maintain my own subscribers.

**One Question on GCP?**

**Look over recent trends of what is going on with Google.**

**Leadership Interview (Tie all of these questions back to pressure)**

**How do you handle pressure?**

* **RFP - RBSY**
  + S – Our boss had been engaged by our RFP team and needed assistance working on a large RFP for the Royal Bank of Scotland.
  + T – He handpicked me as the leader for this particular RFP which contained large components across our whole entire business. The RFP was due in 2 weeks’ time and there was a lot of pressure from our executive staff to win it.
  + A – Being a Self-Starter, I dug right in and coordinated between multiple business units to get on a call. I split out the RFP in workable pieces. I took lead on all the cloud hosting related aspects of the RFP. I worked with product management as there wasn’t a lot of answers posted to questions that had been lined up in the RFP that the team I was working with needed answers on. I couldn’t get answers on some of them. Towards the very end, I keep pushing in a positive way. Answers could still not be found until I heard back from Project Management. I quickly updated the RFP as timing was key and got it back to the right people for submission.
  + R – We completed the whole RFP under the time crunch with the correct answers.
  + M – The customer decided to go with us which brought in under $180,000k MRR for the month.
* **GE Healthcare**
  + S – GE Healthcare was looking to expand their account structure in CLC but had some unsolved issues the account team needed help on answering.
  + T – As part of my responsibility, I helped support our field sales team. I started to dive into GE Healthcare’s questions/issues first. Some of these were SQL pricing and how it worked, Account architecture, etc.
  + A – Since multiple business units were on the call, I received multiple questions that I confidently answered. After I had answered their questions and rounded things out. We started next on their account architecture within CLC
  + R – We started a small POC on separating accounts for the business units that now had conflicting P&L’s
  + M – The questions varied in complexity but ranged up to 20 or more. If I didn’t know something, I let them know I would find out as soon as I could. The pressure came from being consistently under fire but I succeeded.

**How would you handle a challenge?**

* **Mangetis**
  + S – In the spring of 2016, I was diagnosed with viral meningitis which caused me needing to be hospitalized.
  + T – After I had healed, I received a bill in the mail for $7,500 of money that I did not have. The insurance was not wanting to cover it.
  + A – I spoke with the insurance multiple times, I went to a lawyer, I called the doctor. I wrote 3 detailed appeals with supported documentation.
  + R – As a result, I got the insurance to cover it and I only had to pay $1080.
  + M – This process took up to 6 – 8 months to fight for.
* **Presentation of EnMasse**
  + S – Our CenturyLink team ran a monthly cadence with our SE organization. Customer Success stories were presented every now and then.
  + T – I was challenged to demonstrate a customer success and network architecture with how we solved the En Masses’ problem within 1 weeks’ time.
  + A – I prepared by reviewing customer call notes, questions that arose, what issues came up during the time. I then began to diagram their network architecture based upon the notes I had and notes that other SE’s had. I asked for feedback on the architecture. I developed my slide deck, practiced it a couple times. Asked for more feedback. Perfection.
  + R – I presented in the time frame allotted with great success.
  + M – The field like the presentation so much I received 5 or more generous comments on my approach.

**What goal have you reached and how was it achieved?**

* **Polycom**
  + S – During one of our weekly forecasting calls with our regional director, we spent time going in a circle looking at where we were at for the month/quarter.
  + T – Part of my responsibility as a inside TAM was to commit to what I would bring in for the week. I committed to bringing in $135k
  + A – I looked at my pipeline and best case deals. I realized where they were in the funnel. I checked in on every single one of my deals. I considered what it would take to get to the $135k. Rio Grande, $45k, BMC - $90. 2-3 opportunities identified that would be pushed.
  + R – I reached my goal and brought in the $135k. In so doing, I moved 5 more deals into best case and eliminated 3 deals that were in my pipeline.
  + M – During this time, I had 2 demos with customers, talked with 4-6 different reseller partners, and made 20-30 emails/phone calls.
* **Beta Alpha Psi**
  + S – While working full-time, going to school part-time, and supporting a family, I was working towards the tail end of obtaining my first bachelor’s degree.
  + T – I wanted to be an official member of the beta alpha psi organization which is a pristine organization dedicated to students looking to become accountants.
  + A – I went to the initial introduction meeting, attended seminars of different speakers from other organizations, I did volunteer work, networked, etc.
  + R – As a result, I became a member of the beta alpha psi organization through all of my hard work. It wasn’t easy to do.
  + M – I attended 20 hours’ worth of public speaking seminars and additional 40 hours of volunteer work. This was not easy doing every one of those things I mentioned in the beginning but shows where I could take on more responsibilities.
* **Certifications**
  + S – With a recent shift in the market, CenturyLink had started to become a multi-cloud service provider.
  + T – I understood CenturyLink Cloud inside and out. I wanted to diversify myself in another cloud platform by the end of 2017.
  + A – I set on one cloud platform. I purchased courses, tracked my progress in Kanban and listed out tasks I needed to complete, spent over 180 hours of study in with notes that I took, I purchased practice exams, I took the tests.
  + R – I received 3 certifications in 4 months.
  + M – Out of 20 individuals in our organization, I was the first 1 to obtain all 3 certifications in one related cloud platform.

**How have you handled a mistake and how did you handle it?**

* **EnMasse missing numbers from nurturing form.**
  + S – During a review of our teams (6 people) success rate and revenue numbers with our executive staff, an anomaly was noted in the numbers by one of the executive staff members that I had obtained from our cloud platform in EnMasse’s (game publisher) revenue.
  + T – By doing the right thing, I went to work looking to fix my mistake and to make the numbers look as accurate as possible to our executive staff.
  + A – I reviewed the numbers I had put into the spreadsheet, I reviewed the revenue numbers in our cloud platform, I inputted the data once more notating I had forgotten another account they had in the mix. I added in the other account totaling what the numbers should have been. I reformatted the spreadsheet to make it easier to consumer for our executive staff.
  + R – I notified our executive staff that the numbers had been fixed and everything was in order.
  + M - In so doing, the mistake found an additional $20,000k in monthly revenue that was added to our bottom line.
* **Telling customers bad information**
  + **S – B2B Gateway**
  + **T -**
  + **A –**
  + **R –**
  + **M –**

**You had a team mate not meeting expectation, what did you do?**

* Dylan
  + S – As a parent you start to notice trends, our oldest son (7 years old) was becoming later and later arriving to school. His attitude in wanting to be to school on time was not the greatest.
  + T – I wanted to ensure he was on time to school and he succeeded. I told our son earlier that day I would be having a conversation with him after school.
  + A – When he arrived home from school and I had gotten off work, I discussed his actions (attitude) during the morning which resulted in him being tardy. I asked him what he thought he could do better. He realized somethings he could do better. I let him take some time to respond. I set forth a couple punishments for his actions to encourage him to be better moving forward (doing homework when he got home, going to bed earlier so he got enough sleep, reducing time with electronics).
  + R – He has been on time early to school over the last 2 weeks.
  + M – He has arrived 10 minutes early every day.
* **Dustin**
  + S – I noticed Dustin was having trouble navigating through a system that I had extensive experience with registering deals in.
  + T – As a Cloud Solution Architect, we have the responsibility at times to train and coach counterparts. I have engaged on opportunities where reps need coordination or involvement with a cloud partner to work together to try to win the opportunity fast.
  + A – I sent a calendar invite to Dustin for 30 minutes. I went back to his desk. He opened up the tool. I walked him through each portion of the registration form and what each of the fields meant. I walked him through what would happen in terms of next steps once the deal was registered.
  + R – It minimized the amount of questions Dustin had particularly in registering a deal in the tool our team utilized.
  + M – He registered 10 additional deals thereafter on his own.

**What happens if your calendar is double booked? What would you do?**

* Onboarding calls – Corporate Networks touchpoint or Egads kick-off
  + S – Often as an Cloud Solution Architect in my role, we would get invites for calls from our field in the same day or across various different days to support various customers. I had an occasion where I received two calls for different customers at the same time.
  + T - Part of my job is to lead product demonstrations for our customers and kick off a project that shows and conveys we take care of our customers and we’re engaged everything step of the way. How did I take care of this issue?
  + A – I reviewed when both calls were and at what time. I analyzed where each customer was in the sales cycle. Corporate Networks was further down the funnel just needing a touch base. EGAd’s LLC was just starting a new project. I looked to see if I could have someone sit in for me and found a counterpart in this particular case that could help.
  + R – Both customers progressed through their cycles even further as a result.
  + M – Corporate Networks started billing $10K MRR through this.

**Problem Solving (You’ve been hired as a recent Product manager over a trial program that isn’t working, how would you fix it?)**

1. **You’re hired as googles transportation head, how would you get all employees in the Bay area to and from work?**

Data Gather: Where are all the employees located? How far are they from the office? Where is the main office located? What was their previous method of travel? How many employees need transportation? How much did they spend before on travel?

Possible Solution: Walk, Bike, Car, Helicopter, train, skateboard, taxi, bus, boat, roller-skates, hoverboard.

Deliver:

1. **Your friend operates a clothing store in SLC, how would you help your friend develop an online sales strategy?**

Data Gather: What type of clothing does she currently offer? What methods of selling has she used in the past? What has worked/hasn’t? What market’s/demographics does she cater too? What’s her value proposition? What are the items she wants to market? What are her main competitors? What is the goal she is trying to achieve? How employees she currently has? What is her price point.

Possible Solution: Social Media (FB, Instagram, etc), Third-Party sites (wise), website, mobile application, reward payments

Measurement: Conversion to Sales, Click throughs. Don’t assume (10x). Closer to home with the role.

Deliver:

1. **A toy company has been experiencing declining sales the last two seasons. How would you increase sales?**

Data Gather: What were the sales like the last two quarters? What promotions were being ran? What was promoted in the past? How much traffic did the store receive? What were the inventory levels at? What go to market strategy do they use so far? What type of toys do they offer? What is their online presence like? What are their buying demographics from? What is their store layout like? What was their pricing like?

Possible Solution: Direct mailers, discounts, events, reward programs, online strategy, more inventory, demo day

Deliver:

How would you measure success? What type of ratios would you need to find?

Progressive realization of a worthy ideal

* + - Biggest lessons learned
    - Find issues close to home
    - Uncomfortable situations

Questions:

What do you hope I will accomplish in this position?

What goals do you have for the company, yourself, and employees over the next five years?

What do you enjoy most about [working here](https://www.glassdoor.com/blog/5-questions-job-interview/)?

What are the company’s [biggest problems](https://www.glassdoor.com/blog/interview-questions-to-ask-gene-ku/)? How are they overcoming them?

What are your views on goals, timelines, and measuring success?

Can you tell me about the team I’ll be working with?

How competitive are [your employees](https://www.glassdoor.com/blog/11-interview-questions-that-should-make-you-reject-the-job-asap/)?

What does it take to be a [top performer](https://www.glassdoor.com/blog/5-ways-good-impression-job-interview/) at this company?

Is there any other information I can provide you with?

Would you like to see more examples of my work?