Career pathway to become a

CLOUD & DEVOPS ENGINEER

Report by

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The current transition in IT Industry - Overview

Information Technology has been the enabler of digital transformations across industries. However the Information Technology industry is going through a phase of huge transformation. Effects of these transformations in IT sector are being felt across enterprises. Cutting edge emerging technologies in IT are enablers as well as results of this transformation. This makes it crucial to understand how the IT sector is transforming itself.

Transformation can be seen in every aspect of the IT sector. Outsourcing to Uberization in Human resources, On-premises to Cloud in IT infrastructure, Manual to Automation in system administration, Iterative to Continuous in product development, Monolithic to Microservices design in software architecture, and Rule-based Software to Cognitive Software are just some of the examples of this transition. Each one of it is complementing the other and further accelerating the change.

In such a dynamic environment it is imperative that one take his/her career decision by keeping in mind these changes and taking a long-term-perspective. Keeping an open and agile mind-set and continuous learning is the key to a successful career.

Read further to discover the career pathway that we suggest you considering the challenges and the opportunities ahead.

Cloud and DevOps Engineer

Recommendation based on market growth and future opportunities -

IT industry is moving faster than any other contemporary industry. All over the world it is being realized that with the emerging technologies a lot more can be done with fewer individuals. What required a workforce of fifty programmers is now done by a handful of smart professionals specialized in the technology. Traditional maintenance work is getting automated. Jobs in System Administration, Manual testing, Technology support, Service Desk, Monitoring tool and similar others are increasingly being replaced with the help of emerging technologies that include Data Science, Machine Learning and Artificial Intelligence, Cloud, DevOps and Robotic Process Automation.

The Industry is definitely moving more and more towards automation and integration with emerging technologies like Cloud, Big Data, Data Science & Machine Learning, IoT, Cyber security, AR/VR.

To keep up with this changing IT ecosystem we suggest you the below learning path. It includes all the relevant information with career opportunities, compensation growth, job requirements, job description, skills expected in the role and the learning pathway to grow in the technology area.
The IT workforce needs to reinvent as the journey towards digital transformation necessitates new skill sets and continuous learning. The workforce needs to reskill and up-skill to meet the market demands and be market ready.

Keeping the long term Market growth in mind, we recommend you to stick to the first option (Cloud and DevOps Engineer) which is consistent with your current skill-set, provided that you learn the extra skills and cutting edge technology as recommended in the sections that follow.
For a futuristic career ahead you can use the below information as a reference.

Job Description for IT Architect, DevOps Engineers and Cloud Architects:

In the dynamic IT ecosystem infrastructure responsibilities of an IT Architect includes providing seamless integration of application with the infrastructure, providing various environment such as Development, QA, Staging and Deployment. Objective is to use advanced tools to create an automated setup so that the time-to-market of products and/or services can be minimised. They shall ensure the quality of the product/service as well as speed of the delivery. Knowledge of various Cloud, Tools and web services is required to provide a holistic and efficient environment for other stakeholders in the organization.

To start with there are a lot of jobs in the market for role of DevOps engineers and DevOps Managers. Responsibilities of a DevOps Engineer involves working with development, testing, database, and infrastructure teams to introduce automation for build, test and deployment along with monitoring of databases, applications and infrastructures.

It includes but not limited to writing build and deployment scripts using various tools to integrate and automate various stages of software development life-cycle. Daily routines involves setup of automated build processes, support code repository management, integration with cloud computing stack and mobile application consoles. They are responsible to design and and create build deployment guides where product upgrades can take place with a zero or near zero maintenance window. These processes shall support various environments and configuration changes. The engineers should be able to review and suggest performance tuning aspects of applications or tools. They need to periodically review environment monitoring and work on alert guideline documents. They are often required to participate in production support and/or on call.

DevOps Engineer should be self-motivated, enthusiastic, and proactive. The individual should possess valuable experience in application build/deployment/support for on-premise and cloud computing including networking, system administration knowledge and ability to work across multiple teams within the organisation.One should be able to identify operational patterns and issues and creatively automate solutions working with different internal engineering teams and external customer requirements.

Cloud engineers need to have hands-on knowledge about various Public and Private Cloud. In public Cloud AWS is the market leader but there are other very fast growing companies such as Microsoft Azure and Google Cloud.

In private cloud development and administration OpenStack is the market leader. One should have good knowledge of various types of services provided by cloud such as Infrastructure as a Service (IAAS), Platform as a service (PAAS) and Software as a Service (SAAS). Knowledge of one of these cloud services is good to start with however as one gains experience knowledge of multi-tenant cloud and hybrid cloud is needed.

Since cloud is relatively new in IT and every Cloud service provider is launching new services very frequently, one has to keep an eye on the new features and services on cloud.

This skill-set includes having a centralized management/administration mindset. Knowledge about on various aspects of Infrastructure, Network, and Application Security best-practices is mandatory. Skills including the secure transport and storage of sensitive/private data, Infrastructure Automation, Orchestration, and Configuration Management mechanisms and concepts with tools such as Ansible, Puppet, or Chef.

Skill sets required for the job role

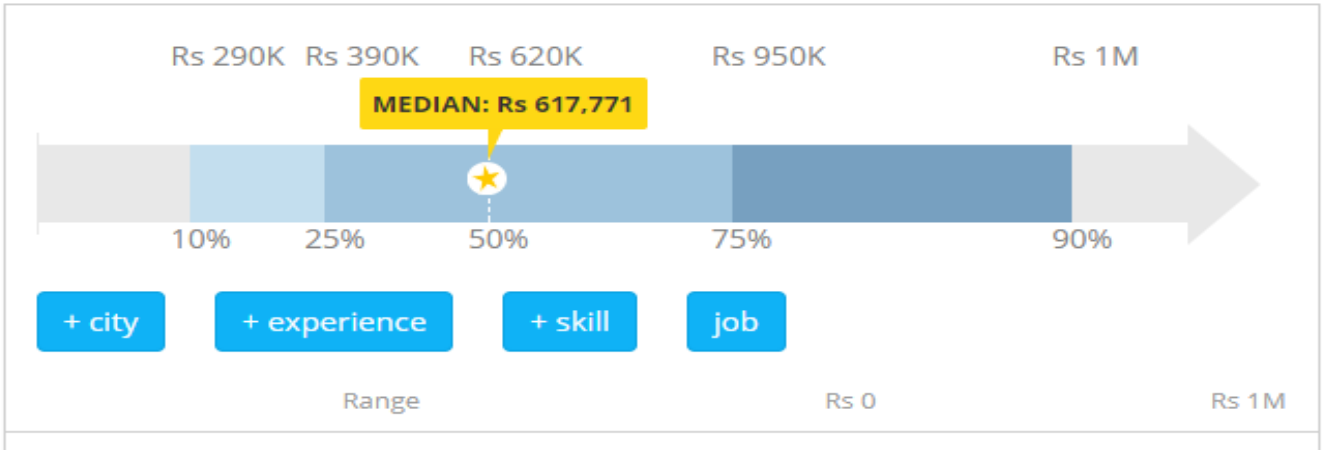
DevOps Engineers are normally required to have a previous experience such as Build Engineer, Production Engineer, Test Engineer with a Bachelor's degree in Engineering. They need following skills to -

- System administration and Linux/UNIX operating systems core concept.
- Knowledge of various public and private cloud such AWS, Google Cloud, Azure, OpenStack.
- Compute, Storage and Network services on Cloud
- Identity and Access management web services on various clouds.
- SQL-based and No-SQL based databases (Mysql, MSSQL, Oracle, MongoDB, CouchDB) and their integration with applications.
- Tools such as Source Code management system (Git, CVS, SVN, Perforce).
- Build Automation tools (Maven, Gradle,Jenkins, MSbuild, Rake).
- Continuous Integration Tools (Jenkins, Bamboo,TeamCity, TFS).
- Infrastructure Automation/orchestration, configuration management tools (Ansible, Chef, Salt, Puppet).
- Networking protocols (TCP/IP, HTTP, SSL etc.), firewalls, load balancers, router/switch and web application architectures.
- Scripting and Programming languages (Python, JavaScript, Ruby, Perl, Shell).
- Operational security processes (Vulnerability Management, Change Management)
- Multi-tenant and Hybrid cloud environment.
- Practices such as Continuous Integration and Continuous Development.

- Understanding of service-oriented architecture (REST APIs, Microservices, Serverless computing, lambda) and API implementation.
- Container Management systems such as Docker, Kubernetes and ECS.
- Program management practices such as Agile SCRUM, Kanban, Confluence JIRA.
- Experience supporting production systems and applications.
- Integration of Cloud based APIs for Machine Learning, Deep learning and Artificial Intelligence.

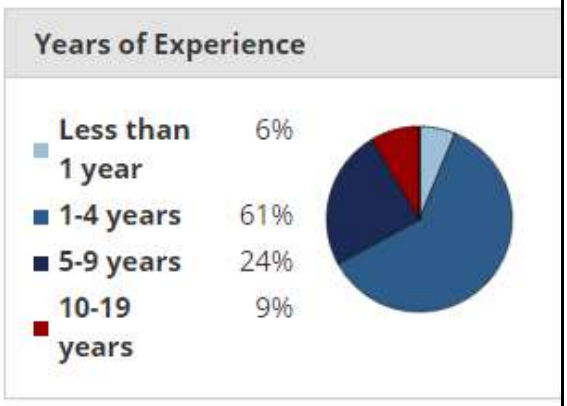
DevOps Engineer Salary*

A DevOps Engineer earns an average salary of Rs 666,232 per year for a starting job role in a decent organization. The compensation further varies from organization to organization and is highly influenced by the experience and the skill sets. A skill in DevOps is associated with high pay. Most people with this job move on to other senior positions like senior architects and solution designers.



** The salary is indicative and will vary based on the skill sets, experience, organization among others.*

Experience distribution for DevOps Engineer

DevOps is a good profile to start the career, as more than 65 % DevOps engineers have less than 4 years of experience. This is attributed to the fact that most of the DevOps tools and skills are relatively new. This gives an edge to new learners to learn new DevOps tools without any baggage of past. With time and experience they can take the role of an IT Architect in future.	

Tasks of IT Architect

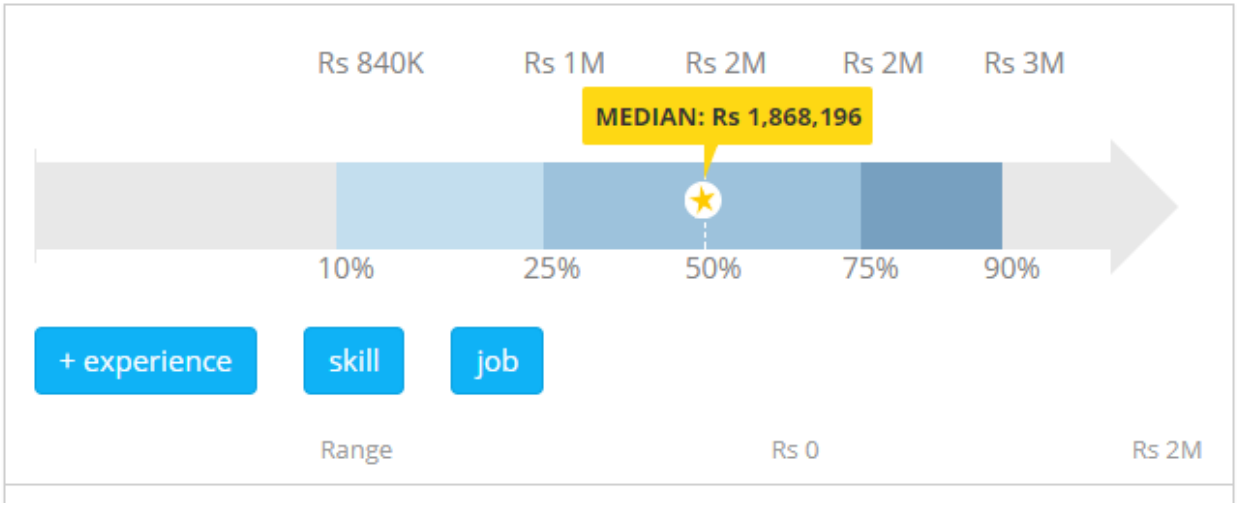
Responsibilities of a cloud Architect includes, but not limited to:

- Designing and implementing a cloud-enabled, multi-tenant Automation/Orchestration infrastructure with a focus on adaptability to ever-changing requirements;
- Research, recommend and implement changes to standards and procedures to enhance automation/orchestration capability;
- Work with front-end and back-end cloud staff to improve awareness of automation capabilities, policies and best practices Identify process and control weaknesses, and
- Develop recommendations and plans to remedy inefficiencies in procedures and standards
- Evaluate new products, service offerings, and new internal applications to ensure that automation assets are handled in accordance with the organization's information policies and quality standards.

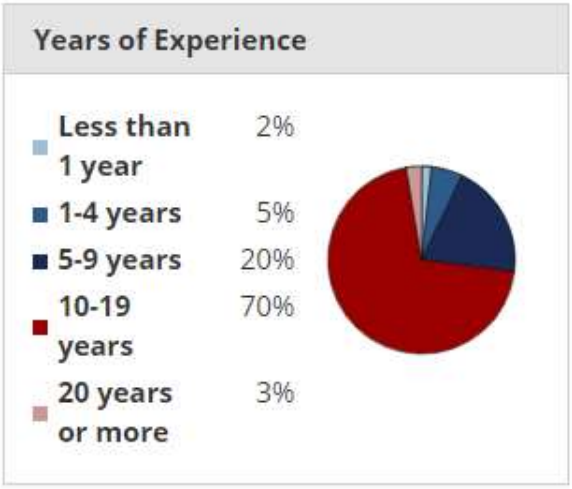
DevOps skill-set and Cloud skill-set are complementary to each other. DevOps operations are easy to implement on Cloud environment. All cloud service providers compliant to various DevOps principles. Professionals with roles of DevOps engineer and Cloud engineers; after the right experience move to the role of IT Architect, Solutions Architect, or Infrastructure Architect.

Information Technology (IT) Architect with Cloud Computing Skills Salary

The average salary for an Information Technology (IT) Architect with Cloud Computing skills is Rs 1,903,545 per year. Most people move on to other jobs if they have more than 20 years' experience in this field. Experience has a moderate effect on income for this job.



Experience distribution for IT Architect with Cloud Computing Skills:

IT architect is a role that requires a lot of industry experience. Around 73 % IT architects have more than 10 years of the experience and in various roles such as Systems engineer, IT Engineer, DevOps Engineer, Cloud engineers etc.	

Long Term Learning Path for IT Architect

Being an IT Architect should be a long term goal for fresh software engineers, but they must start learning the essential skills consciously from very early stage.

Engineers should start with learning the system administration skills on Unix/Linux. Red-Hat System Administration certification is a good certification to have in at an early stage. Even if one does not go for the certification, familiarity with the command line interface (Shells) in Unix, Operating System, Process and File management, User permissions etc. is a must-have skill.

Scripting is required to automate repetitive and mundane tasks in system administration. Shell Scripting should be learnt to make one efficient in the system administration tasks and get started in basic automation.

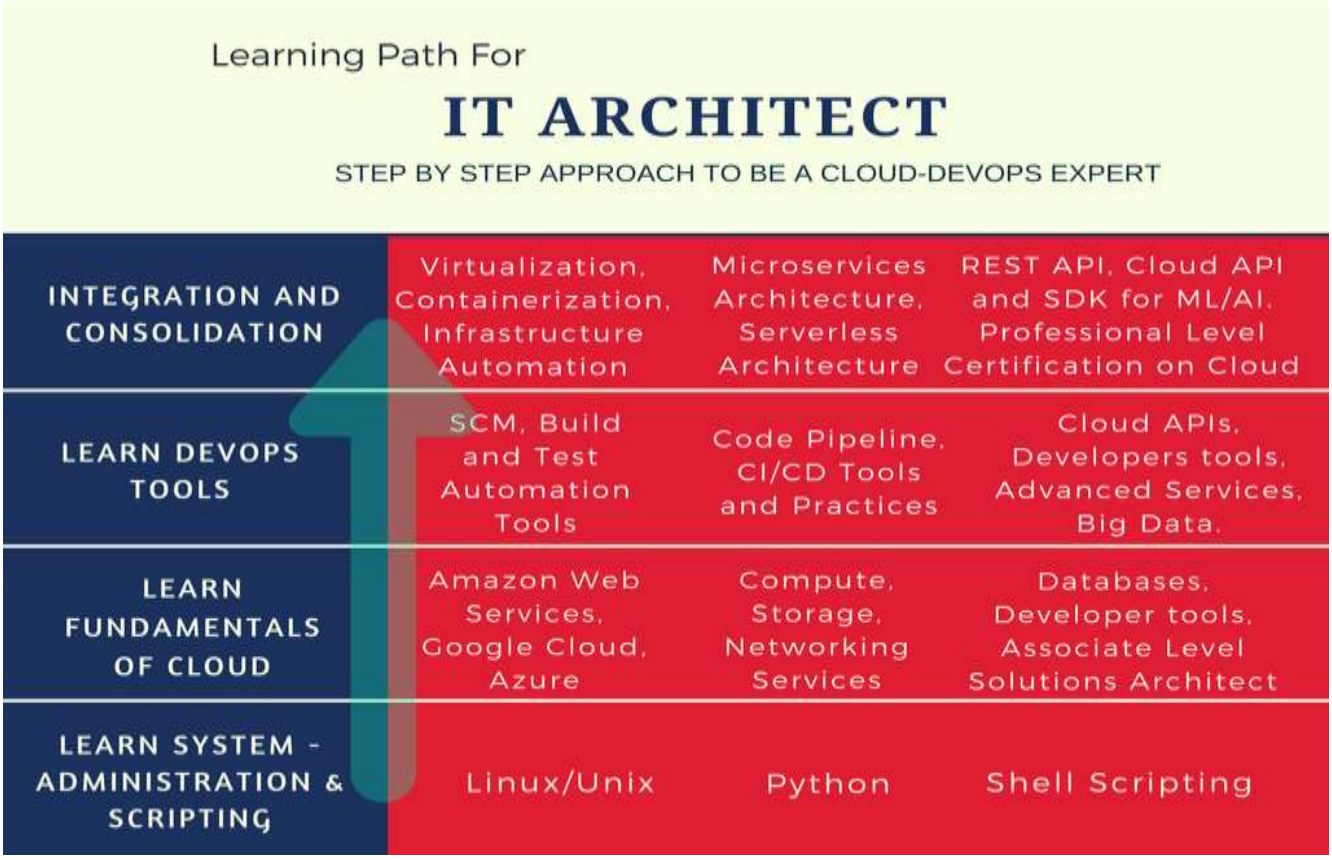
Python is one of the most widely used scripting language in current IT environment and called a Glue language, due to its capacity to integrate systems. Other than being easy to learn, as it have english-like syntax. There are hundreds of Python Libraries available for different use cases. Python is also used as a scripting as well as application-development language as well. Keeping in view the pace of Automation in Infrastructure, it is essential to have knowledge of Python.

Next phase is to learn about cloud infrastructure. There are various public cloud service providers such as Amazon Web Services (AWS), Microsoft Azure, Google Cloud etc. One can start with one of these. Based on the availability of jobs in this domain, AWS is the best bet currently. Fundamental services such as storage services, Compute services, Networking services needs to be focussed along with the cloud ecosystem.

After covering above-mentioned skills one can start with learning various DevOps tools and practices. Practices such as Continuous Integration, Continuous Delivery, Build Automation, Test Automation, Release processes shall be learnt. For engineers the focus should be on learning about various DevOps tools and their integration with one another. These tools include, but not limited to, Git, CVS, Jenkins, Maven, Bamboo, Chef, Puppet, Ansible etc.

Since Devops ecosystem is very dynamic it is bringing massive changes the way application and infrastructure interact. Virtualization and containerisation skills coupled with special reference to cloud infrastructure are very much in demand. Microservices and serverless architecture, Use of REST APIs, Infrastructure Automation, integration of

Machine learning APIs etc. are other important aspects that an IT Architect needs to be good.



Learning Path for you to proceed to proceed towards IT Architect role

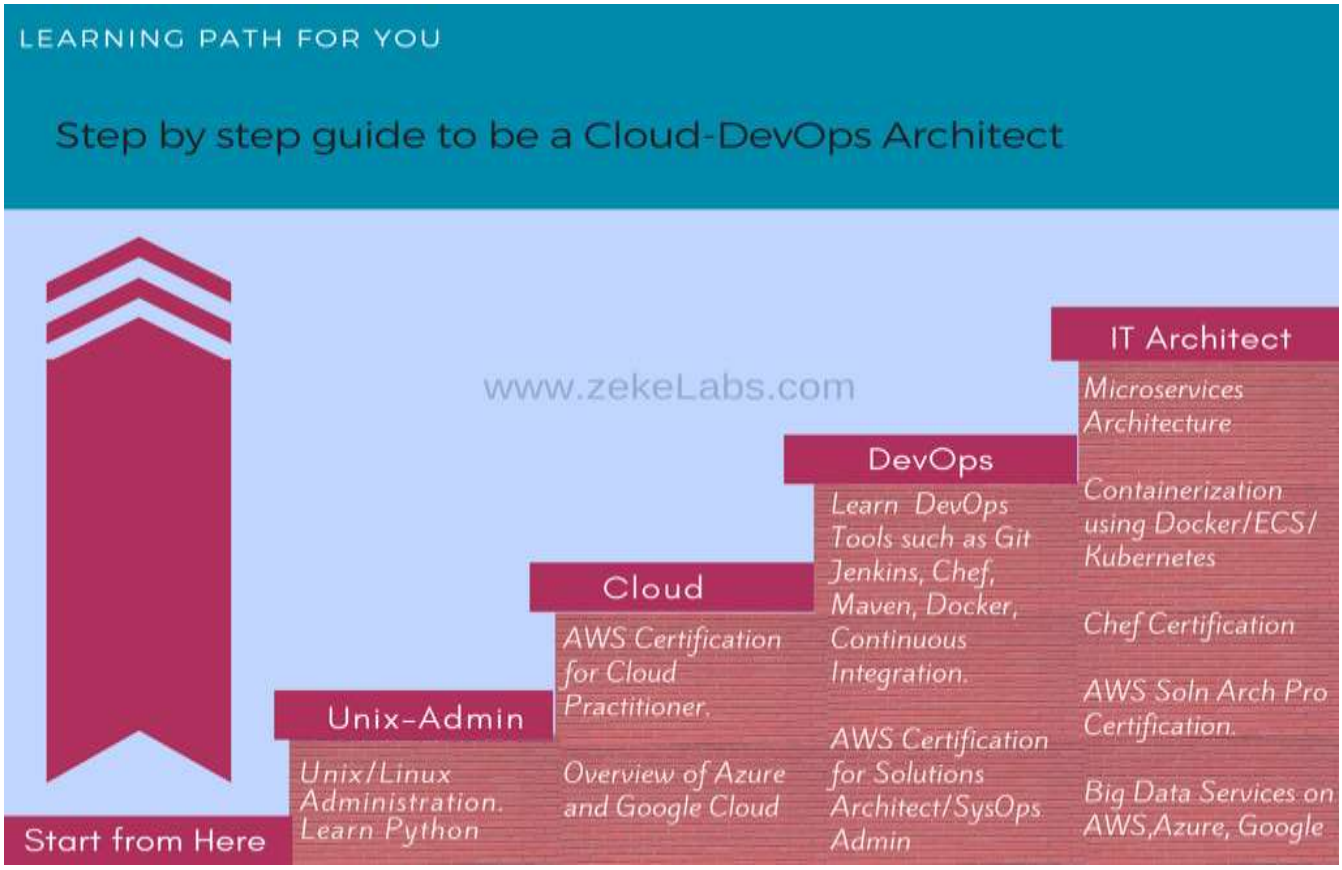
Based on your current profile a proper Learning path would start with learning Python. Learn about the basic programming constructs such as loops, conditional operators, File handling, using modules and libraries.

Since you already have worked on system and server support so it would not take much time to cover all other aspects of System administration.

Next would be learning about one of the public cloud out of Amazon Web Services (AWS), Microsoft Azure and Google Cloud. AWS being the pioneer in the field we recommend you to learn AWS. A lot of cloud features are compliant with the DevOps

philosophy so it would be a good precursor to DevOps tools.

You can then go for some of the most widely used DevOps tools such as Jenkins, Maven, Chef, Docker etc. This will introduce you to the potential of growth that a DevOps engineer have. You can dive deeper in Infrastructure Automation, Virtualization or containerizations and get yourself certified in various technologies such as Chef, AWS, Big Data etc.
By the time you reach to that stage there would be a lot of new technologies may appear.



Reference & credits

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- *https://www.payscale.com/*
- *https://www.google.com/*

There are many other career options to choose from but these are the most popular and in-demand ones. If you have any further questions, please reach out to us at hello@edYoda.com.

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