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. 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.

Career Options with Python

Data Scientist

A Data Scientist profile requires knowledge of the below skill sets:

- Knowledge of Programming language such as R Or Python.
- Programming skills.
- Skills of data collection and data cleaning.
- Using various data structures and libraries for data analysis and processing.
- Skills of using various libraries and tools for data visualization.
- Machine Learning Concepts.
- Machine learning Algorithms.
- Approaches of problem solving using machine learning.
- Tool kits to create intelligent models.
- Training the models.
- Testing the models and evaluating based on various parameters.
- Feature engineering.
- Analytical skills and eyes for details.

You can start by learning below skills sets

- Choose R or Python as your programming language.
- Practice problem solving in the language of your choice in traditional ways.
- Data science concepts and techniques.
- Using Machine Learning and Artificial Intelligence concepts and tool-kits.
- Learn various practices and algorithms in Machine learning field.
- Start solving real life problems using machine learning techniques.

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 make your career as Data Scientist and Machine Learning Expert, 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 Data Scientist:

IT data scientists are responsible for mining complex data and providing systems-related advice for their organization. They design new ways to incorporate vast information with a focus on information technology topics. They work with teams of other IT professionals to manage statistical data and create different models based on the needs of their company. They possess advanced analytical skills, in addition to their exceptional oral and written communication abilities. They process research information for easier consumption and

transform it into actionable plans. They also provide value to their businesses through their findings and thoughtful insights.

IT data scientists follow specific, strict company and industry guidelines in their work. They observe data privacy rights to ensure client satisfaction and avoid legal issues. They create networks of professionals to consult, including internal partners and external colleagues. Most of the time data scientists work in teams using collaborative filtering, k-nearest neighbors, market basket analysis and matrix factorization methods. They deal with cutting edge technologies on a regular basis, and often have the best tools available at their disposal. One of their main work tools is usually an industrial computer with high processing power and proprietary software applications for research tasks.

IT data scientists usually must possess previous work experience in a similar position. They should have advanced knowledge of different data mining techniques such as clustering, regression analysis, decision trees and support vector machines. An advanced degree (such as a PhD) in computer science is usually required for this kind of position, in addition to previous years of work experience in a related field. (Copyright 2017 PayScale.com)

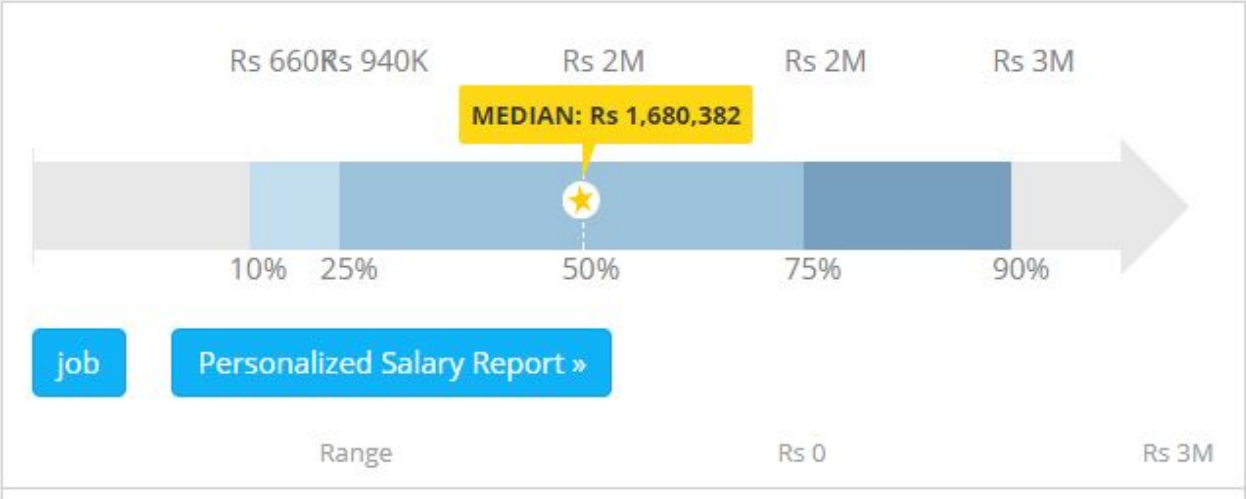
Skill sets required for the job role:

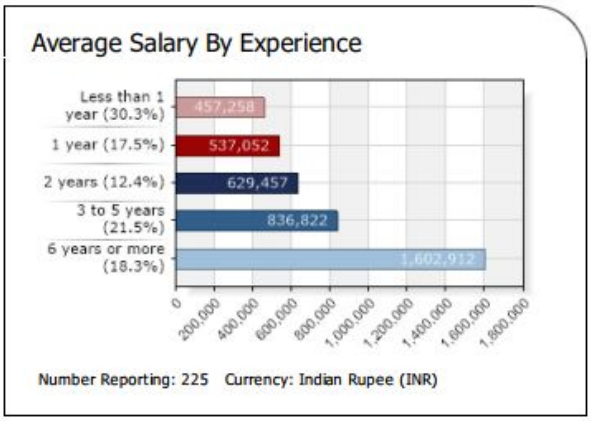
- Programming languages like SAS, R, Python,Java.
- Proficiency in critical thinking and problem solving.
- Strong understanding of data structures, theories, principles, design patterns and practices using at least one programming language.
- Knowledge of machine learning algorithms, text mining techniques, modelling, parameter and performance tuning, artificial intelligence etc.
- Analytics and predictive modeling techniques
- Data mining and machine learning techniques.
- Big Data platforms like Hadoop & Spark etc.
- NumPy, Pandas, SciKit Learn, Keras, Tensorflow libraries.
- Natural Language Processing: processing natural language data for classification, entity extraction, or summarization.
- skill to work with structured and unstructured data, static and streaming data, integrating data, profiling, validating and cleansing data.
- In-depth business knowledge, insights, and techniques such as data visualization, statistical modelling and tests, and data mining techniques to identify the customer or prospect needs, behavioral trends, product preferences etc.

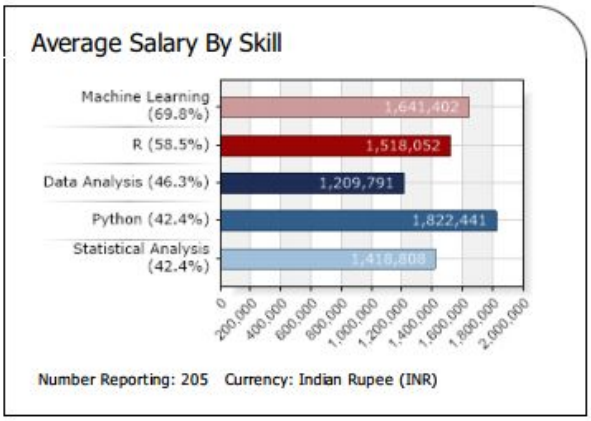
- Neural Networks, Deep learning, Random Forest, GBM, KNN, SVM, Bayesian, artificial intelligence etc.
- Human- Robot/Human -Computer interaction, computer vision.
- Ability to discover new opportunities where advanced analytical techniques can be leveraged for solving business problems.
- Big data interpretation/crunching to unleash the power of data, generate predictions which can help automated solutions for improved user experiences.
- Develop and design algorithms and frameworks in terms of APIs to leverage this data.
- Exposure to IOT, cognitive cloud APIs, Business Intelligence (BI) tools (such as Tableau), devOps tools and good knowledge on database can be an added advantage.

Data scientist Salary*

A Data Scientist earns an average salary of Rs 629,457 per year for a starting job role with almost 2 years of experience, 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 deep learning is associated with high pay. Most people with this job move on to other senior positions like solutions architects and AI .

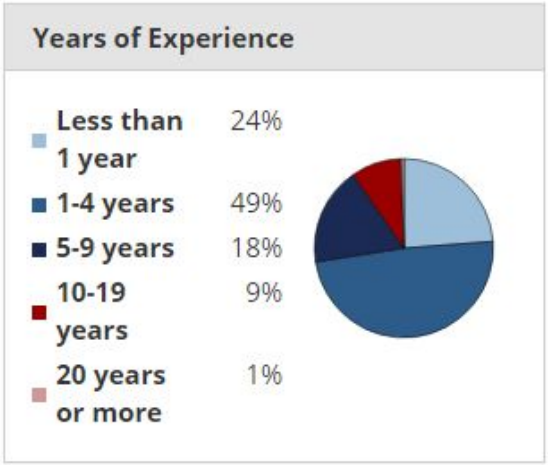






** The salary is indicative and will vary based on the skill sets, experience, organization among others.*

Experience distribution for IT Data Scientist

Data Science is a good profile to start the career, as more than 73% Data Scientists have less than 4 years of experience. This is attributed to the fact that a lot of companies have started realizing the need of cognitive softwares recently only. Most of the machine learning libraries and tool-kits were launched in last few years only. This gives an edge to new learners who want to make a career in field of the ecosystem of cognitive technologies.	

Tasks of IT Data Scientist:

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

Design and build new data set processes for modeling, data mining, and production purposes.

- Determine new ways to improve data and search quality, and predictive capabilities.

- Perform and interpret data studies and product experiments concerning new data sources or new uses for existing data sources.
- Develop prototypes, proof of concepts, algorithms, predictive models, and custom analysis.
- Search for patterns in data that can provide solutions to business problems or create new business opportunities.
- Use advanced mathematical and computer science skills to analyze vast pools of data under the limited guidance of the lead/principal data scientist.
- Communicate clearly and effectively with both clients and multi-disciplinary teams.

Long Term Learning Path for a Data Scientist

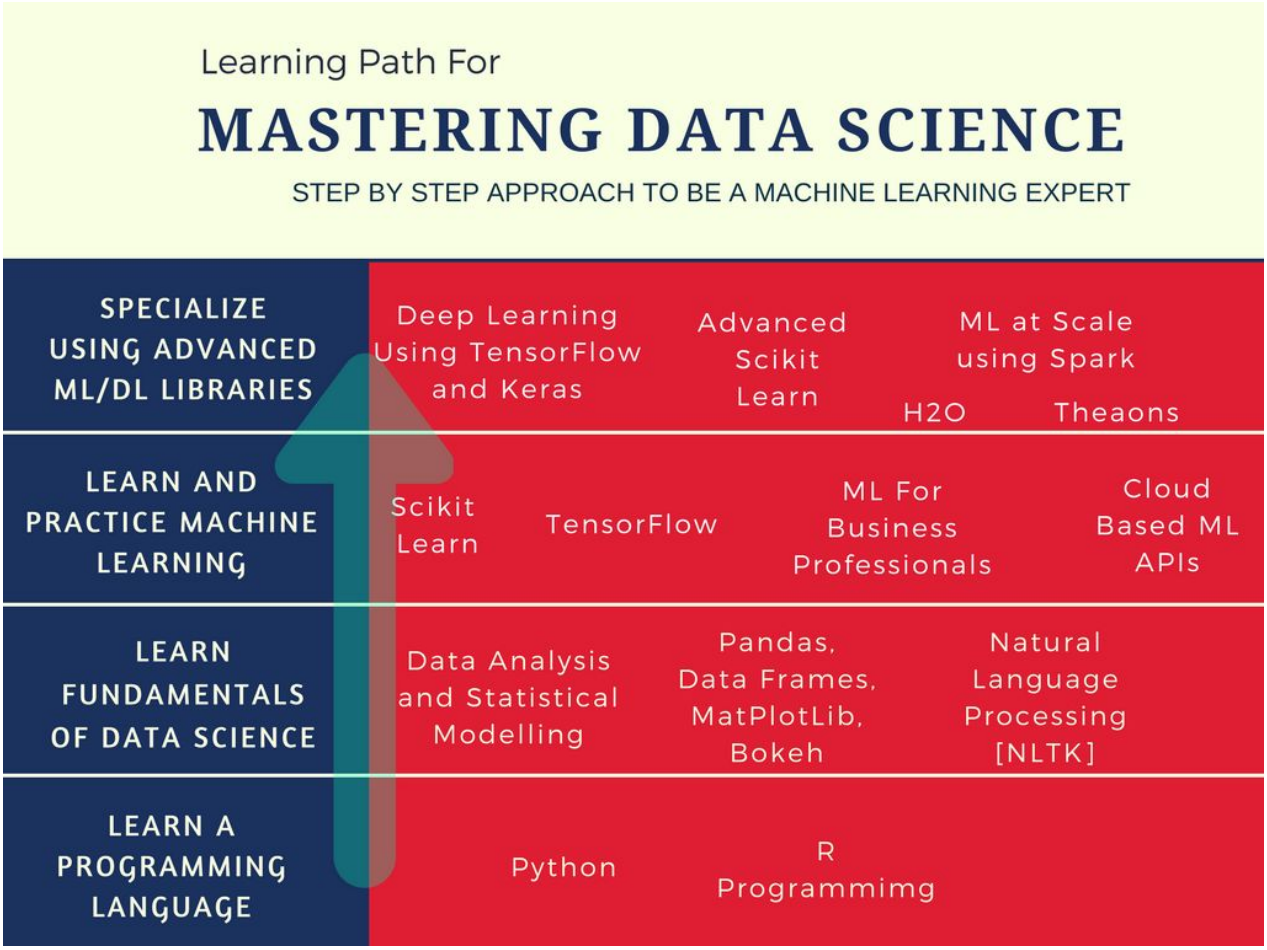
Data scientist profile is normally of two types: first, where the focus is given more on research and theoretical part, second, where focus is more on engineering part. While the former is concerned with statistical modelling, development of libraries at low-level, the later profile is focussed on building solution using the libraries and tool-kits that are made available by others. For the former role there are various graduate and post-graduate courses and research opportunities in universities. For the later role it can be learned along side the jobs with a more hands-on approach. Here we will be talking more about the later role as it suits your profile better.

To be a machine learning expert in the software field an engineer shall start with learning a suitable programming language. R, Python and SAS are some programming languages best-suited for machine learning. Language constructs, good programming practices shall be learned and practices. One can start solving basic problems using one's chosen programming language.

To train a machine learning model one needs to feed this model a lot of data. A machine learning model is only as good as the data used to train it. This is why practices of Data science are so important in Machine Learning. In fact Machine Learning is deemed as extension to Data Science.

Practice of real-life problem solving is something that defines good data scientist. So one need to explore multitude of problems, try to solve them by using various algorithms. There are various websites that host these problems and related data, to be solved by Data Scientists. A Data scientist evaluates various models on different parameters and picks the best one.

After starting with generic problems, over the time Machine Learning experts get specialised in a particular domain, based on their choice and industry in which they work. Since it is a dynamic field and everyday new tool-kits and libraries are coming in the ecosystem. So a good data scientist has to keep abreast of the new technologies and developments in this field.



Learning Path for You to be a Data Scientist and Machine learning Expert

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.

Next would be learning about the terminologies and concepts of Data science. You will learn about various stages of working with data such as collection of data from various sources, cleaning data, analysing and processing of data and visualizing data. Since Machine Learning softwares get their training from vast amount of data so data science becomes prerequisite of Machine Learning. You will be learning about how you can use various libraries and data structures in Python to process the data in hand.

After learning Data Science you can start with learning concepts and common terminologies of Machine Learning. You will learn about how exactly Machine Learning is different from traditional software programming and exploring ecosystem of cognitive computing. You shall explore at this stage about various tools and infrastructure provided by various cloud service providers such as Google, Microsoft and AWS.

Having learnt about the concepts of Machine Learning you shall learn about various algorithms in the field of machine learning, their use cases, pros and cons of these algorithms and which algorithm to use when. Using these algorithms you will be building Machine Learning models and training these models from the data and evaluating these models for their accuracy by using test data. Doing all these you will be using various Python Libraries such as Scikit-learn, TensorFlow etc. Once you know the basics you shall start with solving real life problems with help of machine learning. There are various portals on internet that provide such problems and related data and information.

While solving these use-cases you will be learning about when to use which model, best practices and limitations of Machine Learning. At this stage a machine learning engineer can start with learning Deep Learning methods and how it is different from Machine Learning techniques. You can learn about various libraries and tool-kits for Deep Learning and solve the problems at a higher scale.

The field of Cognitive computing is very dynamic, so by the time you reach at this stage a lot of other tool-kits, libraries would have come in this field. You shall keep yourself updated with the developments in this domain constantly.

Web Developer

A Web Developer profile requires knowledge of the below skill sets:

- Knowledge of Programming language such as Python, Java, Javascript, Ruby.
- Learn one of the framework of the language that you choose, like Django for Python, Spring for Java, NodeJS for Javascript, Ruby on Rails for Ruby. We suggest you go with Django as it highly in demand.

Job Description for Web Developer:

The role is responsible for designing, coding and modifying websites, from layout to function and according to a client's specifications. Strive to create visually appealing sites that feature user-friendly design and clear navigation.

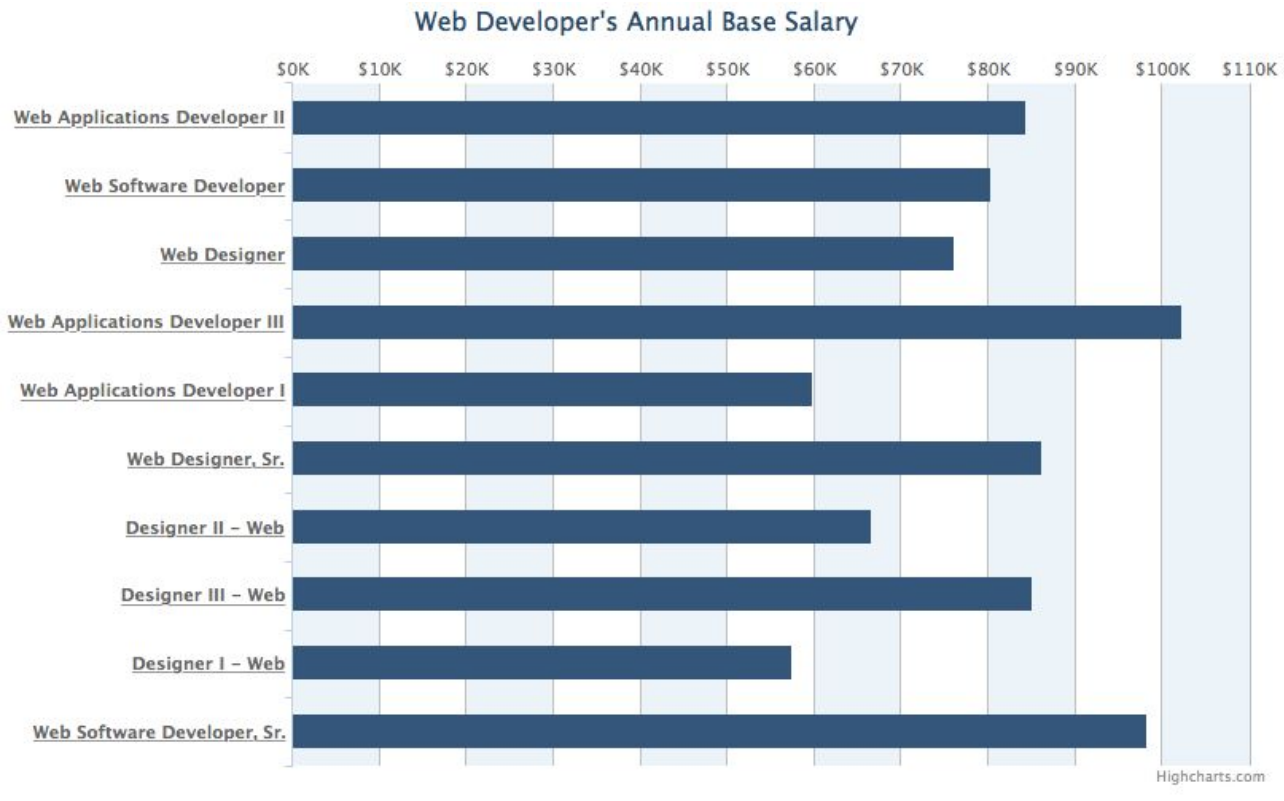
Web Developer Job Duties:

- Regular exposure to business stakeholders and executive management, as well as the authority and scope to apply your expertise to many interesting technical problems.
- Candidate must have a strong understanding of UI, cross-browser compatibility, general web functions and standards.
- The position requires constant communication with colleagues.
- Experience in planning and delivering software platforms used across multiple products and organizational units.
- Deep expertise and hands on experience with Web Applications and programming languages such as HTML, CSS, JavaScript, JQuery and API's.
- Deep functional knowledge or hands on design experience with Web Services (REST, SOAP, etc ..) is needed to be successful in this position.
- Strong grasp of security principles and how they apply to E-Commerce applications.

Skill sets required for the job role:

- JavaScript, JQuery, HTML, HTML5, CSS, CSS3,
- Web Programming Skills (like Python and Django),
- Web User Interface Design (UI),
- Security Principles,
- Object-Oriented Design,
- Web Services (REST/SOAP),
- Multimedia Content Development,
- API's

Web Developer Salary*



Experience distribution for Web Developer

Just like in every other field, salary depends mainly on a number of experiences. In web development, fresh people are hired more frequently since they are considered to be knowledgeable about the latest trend. However, the more you are in this field, the higher you earn. Getting old as web developer only gets beneficial if you keep learning and adopting new trends with time. There is always a space for freshmen but salary keeps rising with time.

Going into 2019, one thing to keep in mind is many of the junior developer positions can be lucrative because online coding bootcamps, resources to learn code for free, and other paid resources count as credible sources that you know what your doing.

Long Term Learning Path for a Web Developer

If you're interested to build maintainable, scalable, secure web services and applications using the best tools and techniques of Django, then go for this Learning Path.

Prerequisites: Familiarity with HTML, CSS, and JavaScript is needed. Working knowledge on Python is a must. Basic knowledge on RESTful APIs would be useful.

- Develop powerful web applications quickly using the best coding practices

- Learn Django from basics to advance.
- Integrate other technologies such as Redis, Celery, Solr, and Memcached into your application with clear, step-by-step explanations and comprehensive example code
- Add authentication and permissions to a RESTful API built in the Django framework

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Test Engineer

Testing plays a significant role in development of new software and systems. Testing Engineers work closely with software developers and program managers to iron out any bugs in the product, and improve the quality of the finished product. There's a common saying in the IT industry that behind every successful software is a careful Testing Engineer. Thus having the right candidate as a Testing Engineer is vital to the success of the product.

Job Description for Test Engineer:

A Testing Engineer is required to fully test the product or system to ensure it functions properly and meets the business needs. The job responsibilities include:

- Testing all aspects of the product/system like function/component, system, performance, regression and service.
- Work with development team to identify and capture test cases, ensure version management
- Setting up of test environments, designing test plans, developing test cases/scenarios/usage cases, and executing these cases.

- Providing feedback on usability and serviceability, trace the result to quality risk and report it to concerned people.

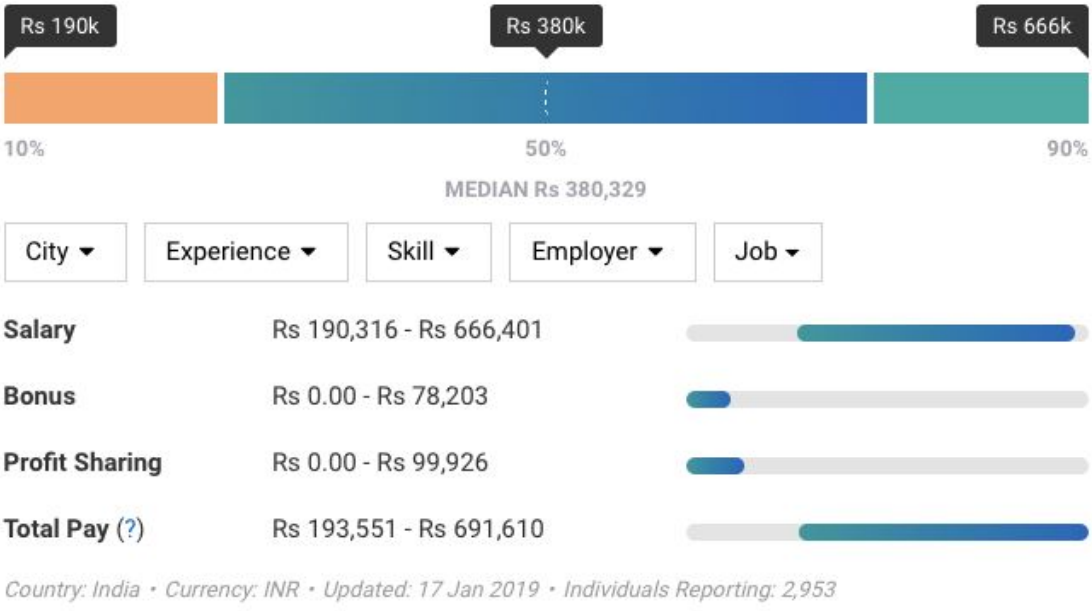
Skill sets required for the job role:

Technical knowledge and experience is a basic requirement for this kind of role which involves knowledge of automation testing tools such as **Selenium**. The Testing Engineer also needs to be tactful and diplomatic to maintain a good working relationship with the software developers. Other skills and competencies that employers look for are:

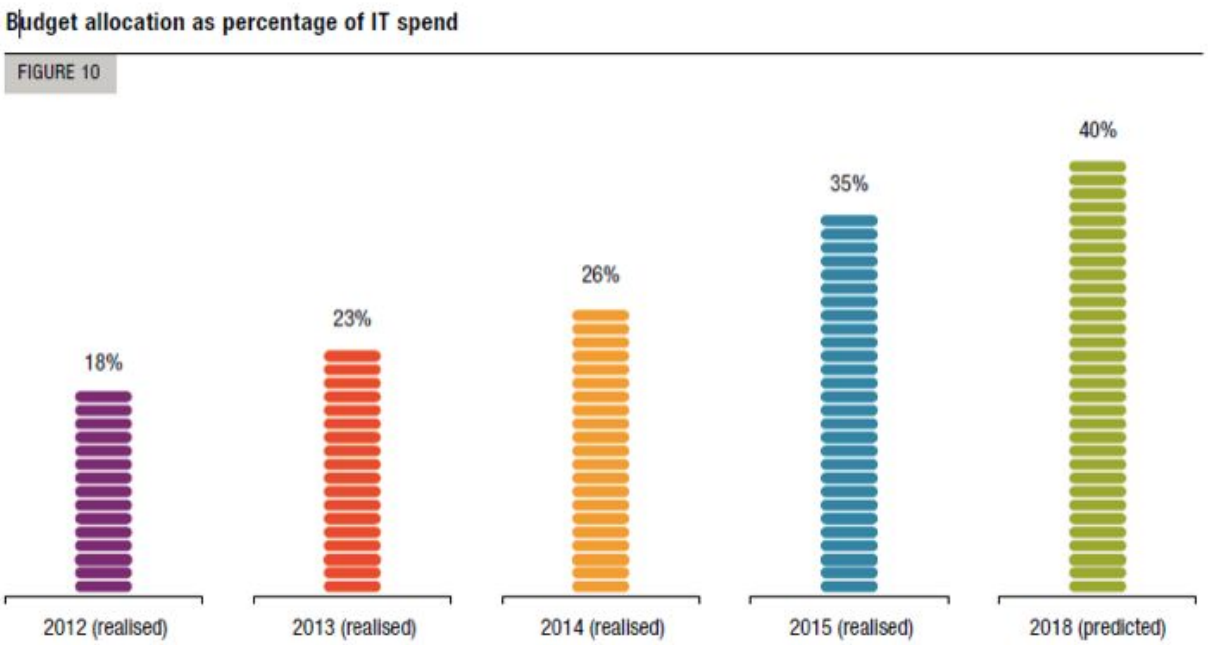
- An understanding of the software development life cycle as well as the business approach for the product
- Analytical skills
- Decision making ability
- Attention to details
- Ability to work in a team as well as an individual
- Ability to work under pressure and maintain deadlines

Test Engineer Salary*

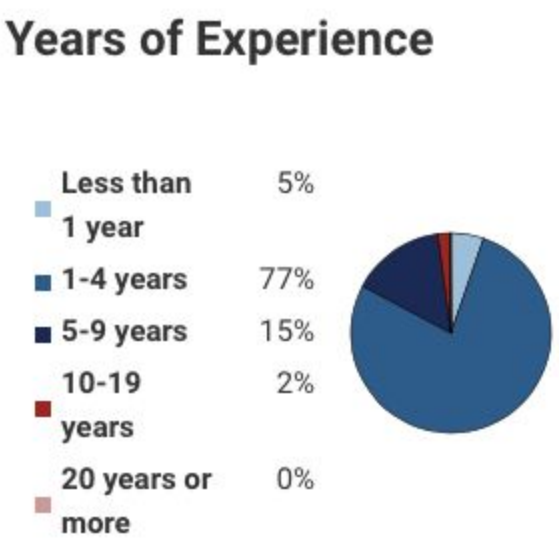
The average pay for a Test Engineer is Rs 380,329 per year.



According to World Quality Report 2015, budget for QA and Testing have risen to an average of 35% of total IT spend.



Experience distribution for Test Engineer



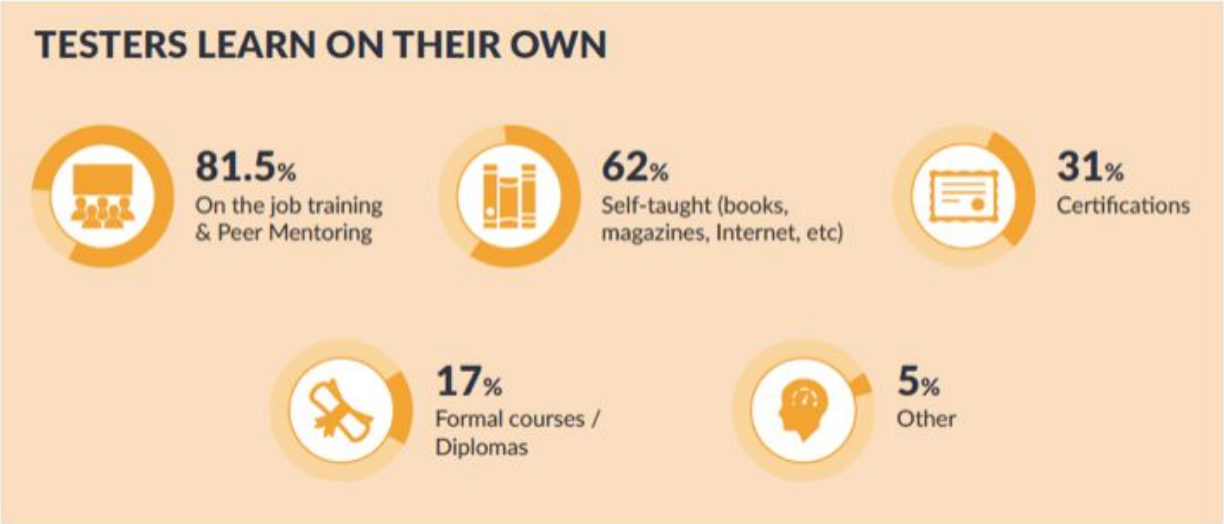
Long Term Learning Path for a Test Engineer

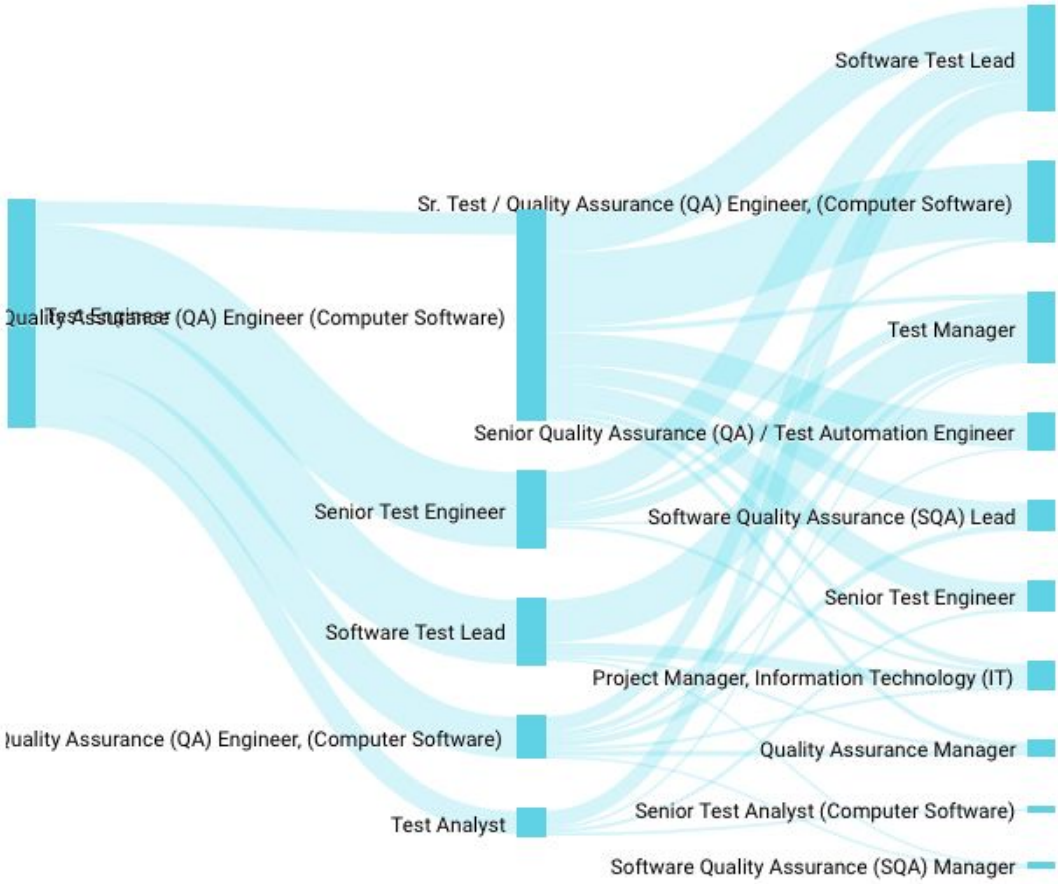
Automation is where the world is. It helps you achieve your goals faster, maximize your productivity and improve quality. So as a tester it is highly important to learn automation techniques to stay relevant.

Following steps can help you become better at this:

- Learn the basics of automation testing
- Hands-on experience of automation tools and frameworks such as Selenium.
- Learn Python to automate your tasks.

62% testers choose self-learning path:





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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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