

A decorative background graphic on the left side of the slide features a dense network of blue and red lines connecting various nodes, resembling a data visualization or a complex network diagram. The lines flow from the top left towards the bottom right, with some nodes highlighted in red and others in blue.

Principal Engineer - Talent Analysis

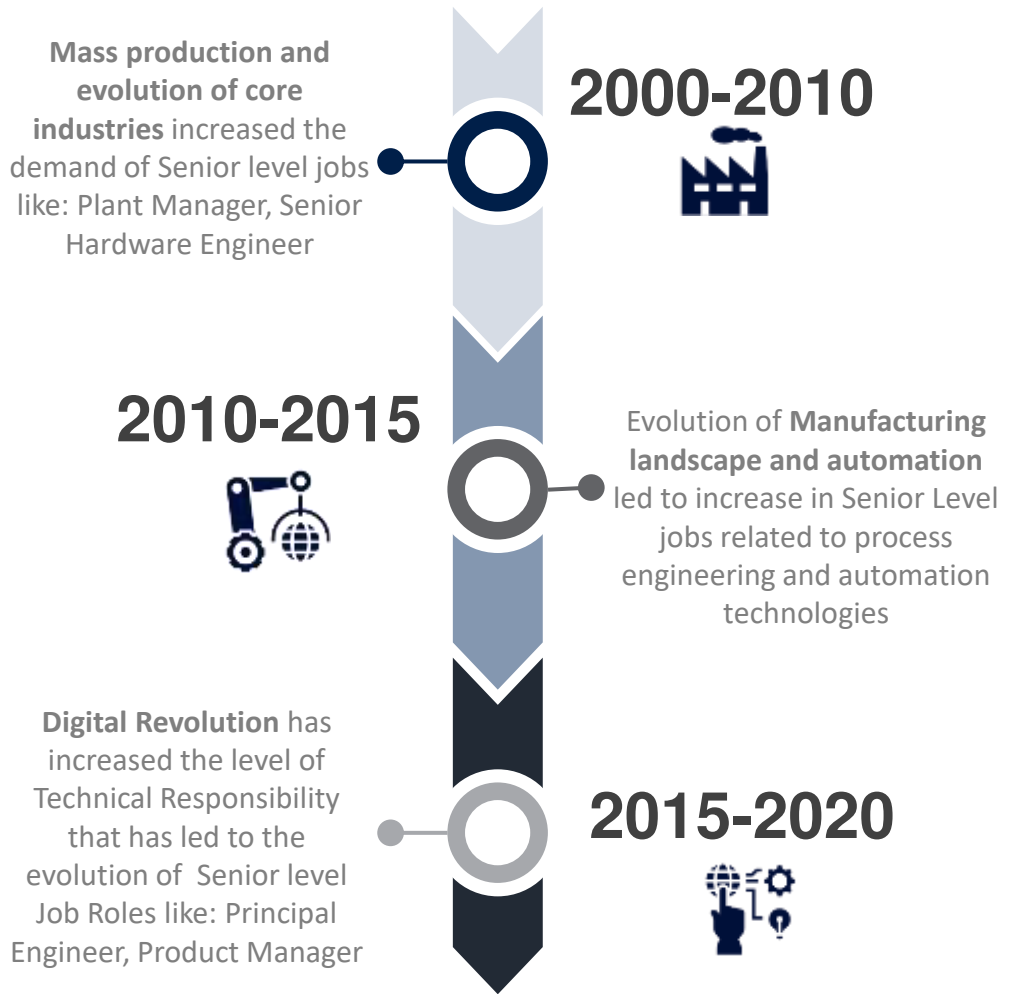
Conceptualized and Developed: March - 2021

*The objective of the document is to analyse how Principal Engineering talent has emerged due to complex workloads and technological advancements. This document also provides an overview of job responsibilities, skills of Principal Engineer, how traditional roles are transitioning to Principal Engineer job roles, and global location hotspots analysis for targeted hiring for **Retail** Industry*

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With emerging technologies and increasing complexity of workloads in Retail sector, Various senior level job roles have emerged in past few years

Digitalization across industries has led to effective resource allocation and utilization to improve the speed of Project Delivery, which has ultimately led to the emergence of senior job roles with expertise and experience across broader areas



With the ever moving world of technology, Retail Organizations need people with right skills and capabilities to respond to this rate of change and establish Agile methodologies and practices

Increase in global Job demand of sample Senior level Job roles in 2020 as compared to 2019

Principal Engineer	▲ 30%
Product Manager	▲ 24%
Product Owner	▲ 22%
Staff Engineer	▲ 18%
Distinguished Engineer	▲ 16%
Project Manager	▲ 12%

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Considering the recent increase in demand for 'Principal Engineer' job role in Retail sector, following components have been analysed in detail for 'Principal Engineer':

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• **Job Role Overview: Principal Engineer**

1. Supply & Demand of Principal Engineer talent
2. In-demand skills & workloads
3. Job description overview

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• Career ladder and Job Role Transition Case Study

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• Location intelligence for Principal Engineer talent

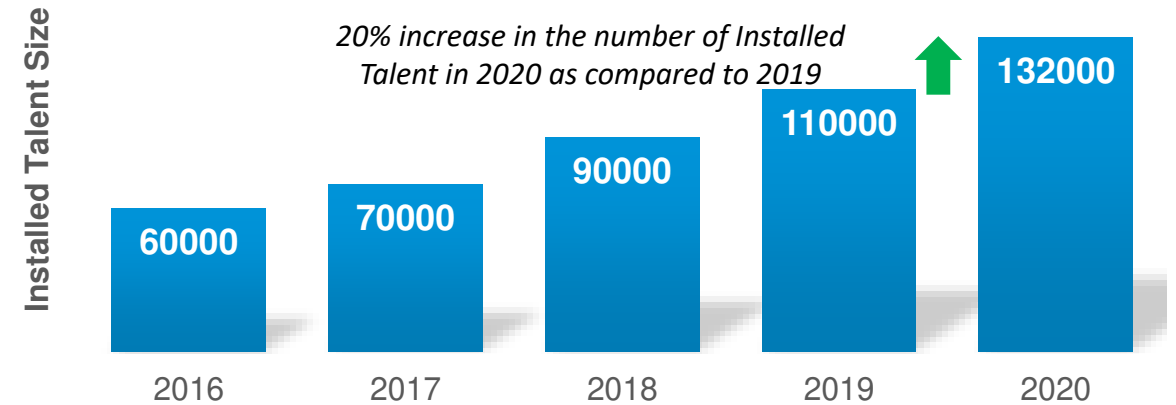
Principal Engineers are recognized as engineering authorities having extensive practical experience gained from working as an Engineer and typically answer directly to the senior management of their company

Principal Engineer performs some of the crucial duties that are required for an Organization to excel at technical level

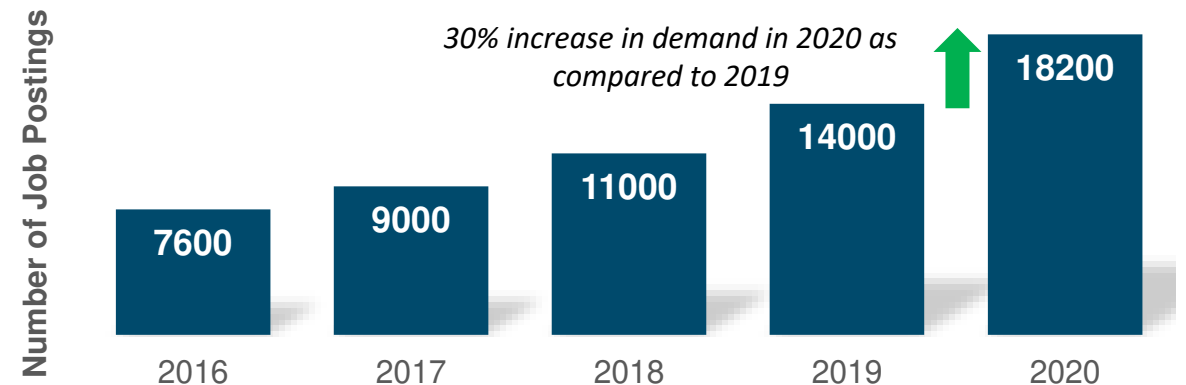
- They are known to handle **Challenging Projects** that requires the work of several teams
- They take **Technical Ownership** of the complex project that they have in hand
- They amplify the impact by leading various complex software and its features by providing **Technical Leadership**
- They **Educate** other engineers both at individual level and at scale keeping the engineering community up to date

Complexity of work performed and increase in demand of domain specific technical experts has led to increase in demand for Principal Engineers

Principal Engineer Installed Talent Globally



Principal Engineer Job Postings Globally

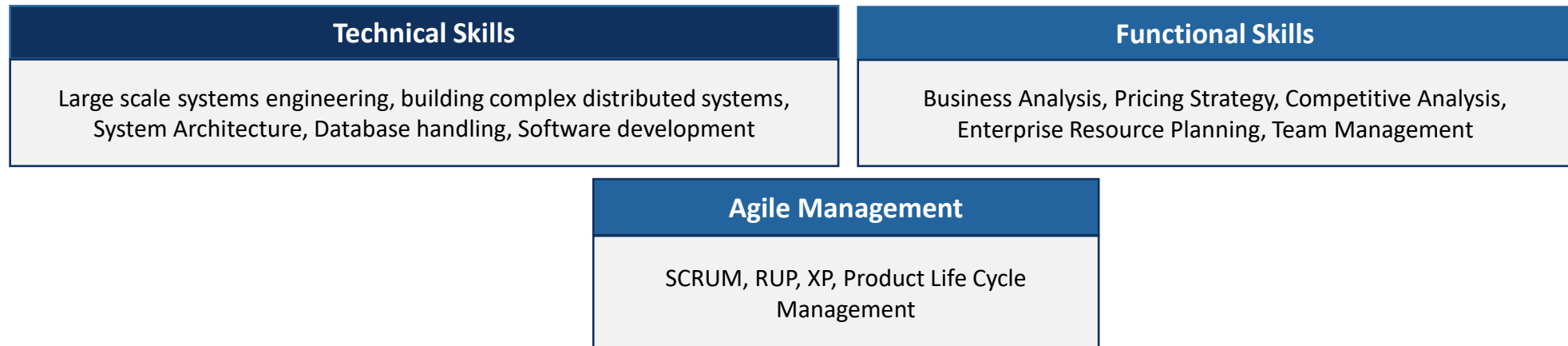


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Principal Engineer – Skills Analysis

Technical Responsibilities	Functional Area
<ul style="list-style-type: none"> Oversee the product's or project's conception, design and initial product specifications and manage scheduling, estimating and securing materials Provide engineering guidance to other departments and build high quality, scalable, and architecturally sound systems that align with the business needs Establish technical standards and drive system architecture, engineering practices, and engineering methodologies Conduct engineering studies and investigations and prepare reports for company leadership 	<p>Search and Information Retrieval; Robotics; Security; Hardware; Embedded Systems; Networking; Operating Systems, Cloud, IoT, Testing, Product Design, Software development</p>

Skills Required



Draup leveraged text mining model to identify the job descriptions at various levels of companies to better position the role level analysis



	Principal Software Engineer (Job description across various levels of companies)			
	amazon	TARGET	Walmart	Stealth Start-up
Job Responsibilities	<p>Establish technical standards and drive system architecture, engineering practices, and engineering methodologies</p> <p>Expertise in high-level architectural design and build high quality, scalable, and architecturally sound systems that align with the business needs</p> <p>Lead development life cycle process</p>	<p>Design and develop architectures to handle web-scale data and its organisation</p> <p>Create high scalable, reliable, resilient and available big data platform</p> <p>Work with engineering leaders in building a high performing engineering team and talent</p>	<p>Responsible for various key product development including but not limited to Microservice platform, Service Mesh, Configuration Management System, GraphQL etc.</p> <p>Leads and participates in medium- to large-scale, complex, cross-functional projects</p> <p>Leads the discovery phase of medium to large projects</p>	<p>Analyze, design, code, test, debug, maintain, and document software components in accordance with the software architecture and software development processes</p> <p>Build the process to elicit and specify project requirements and define project scope</p> <p>Assist in development of software application architecture</p>
Area's of Experience / Technical Skills required	<p>Experience leading the delivery of services and large-scale distributed systems</p> <p>Agile Management (SCRUM, RUP, XP), OO Modeling,</p>	<p>Experience in software development of large-scale distributed systems</p> <p>Experience in data related technologies and open source frameworks</p>	<p>Thorough DB experience including RDB, NoSQL, Document DB etc.</p> <p>7+ years in Java, C++, Golang, Rust, Scala, ReactJS, Node.js experience</p> <p>Experience with GraphQL</p>	<p>Experience with micro-services and other service oriented architectures and design methodologies (like BDD/DDD)</p> <p>Experience turning requirements into software design specifications and architecture</p>
Qualification	<p>10+ years of relevant, broad engineering experience</p> <p>Bachelor's degree in computer science or related technical field</p>	<p>12+ years of experience as a software development engineer in the commercial software industry</p> <p>MS degree or PhD degree in CS or math or Engineering or DS</p>	<p>5-7 years of experience in related field</p>	<p>B.S. in Computer Science required or a combination of equivalent educational experience</p>

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Note: Draup leveraged text mining to identify top skill and responsibilities of the top companies

Principal Engineer job roles analysis in Start-ups vs Corporates: Start-ups tend to have a faster career growth compared to the MNC's. More than 25% of the Principal Engineers in start-ups have 3 – 8 years of experience



Parameters	Principal Engineering - Professionals	
	Start-ups	Corporates / MNC's
Experience Level	More than 25% of the Principal Engineer professionals are at Entry/Mid level experience between 3 – 8 Years	Majority 95% of the Principal Engineer professionals are at Senior level with more than 10 Years of experience
Talent Maturity	Talent Maturity is comparatively lower than the professionals at MNC's	Talent Maturity is high with wider exposure to new-age technologies with high professionalism
Product Focus	Circumscribed towards a particular product/service stream with limited opportunities of wider view	Diverse experience/knowledge across various business disciplines and engineering disciplines
Core Responsibilities	Principal Engineer at Start-up companies directly involve in the transformative software development and agile management	Principal Engineer at MNC's Oversee the product's or project's conception, design initial product specifications
Managerial/ Behavioural Skills	Managerial / Behavioural Skills includes Team Leadership, Analytical/Debugging skills	Managerial / Behavioural Skills includes Team management, Problem-solving and decision-making skills
Sample Profiles	 <p>Michael Hogg Designation: Principal Engineer Company: A start-up in Boston Total Years of Experience: 6 Years</p> <ul style="list-style-type: none"> Manage and lead a mechanical development team to ensure the on-time development of reliable products Develop validation plans based on analysis, simulation and FMEA to mitigate potential risks <p>Education Background: (BE) Mechanical Engineering at Western University</p>	 <p>Gary Rexford Designation: Principal Engineer Company: A MNC in Boston Total Years of Experience: 26 Years</p> <ul style="list-style-type: none"> Lead engineer on new products including system level setup, integration and validation within the NAS and SAN market Responsible for creating design of experiments for a multitude of hardware, firmware, protocol, and signal integrity related issues <p>Education Background: (BE) Electrical Engineering at Rochester Institute</p>

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Note : Draup's proprietary talent module was used to analyse the above represented data's.
 Source: Job Descriptions posted by HR professionals at public forums

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- Job Role Overview: Principal Engineer

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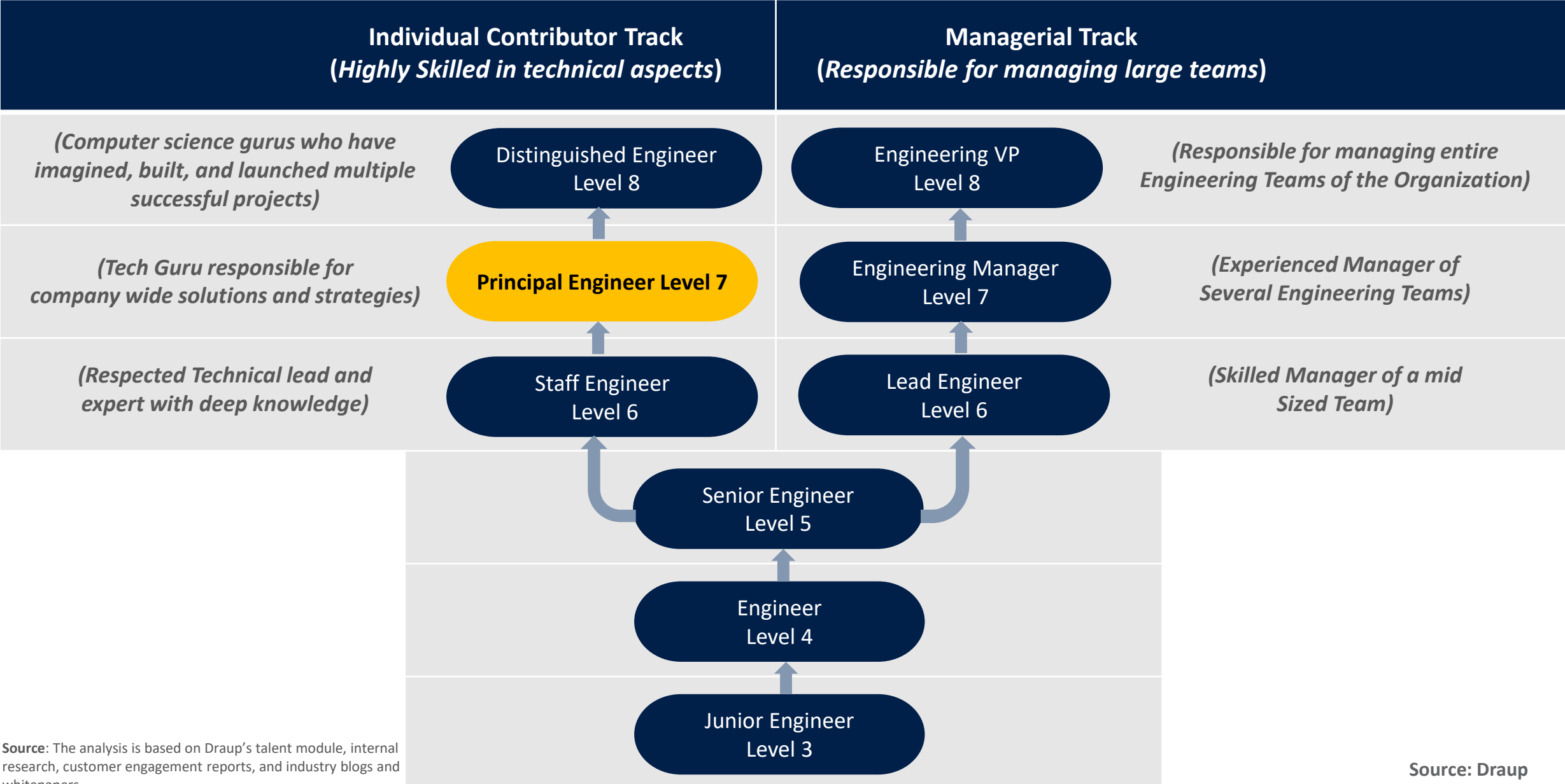
- **Career ladder and Job Role Transition analysis**

1. Principal Engineer - Career Ladder
2. Principal Engineer – Job Role Transition
3. Job Role Transition Sample Case Study

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- Location intelligence for Principal Engineer talent

Career Ladder of Principal Engineer: Experienced Engineer (at Level 5) in Retail, can either progress towards Managerial Track or Individual Contributor Track, where he/she can finally become Principal Engineer



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Source: The analysis is based on Draup's talent module, internal research, customer engagement reports, and industry blogs and whitepapers

Principal Engineer – Job Role Transition: Software Development Job Family has seen maximum career transition towards Principal Engineer specific Job Role followed by Hardware, Network Engineering across Industries



Job Family	Job Titles	Analysed percentage of Transitions across each job family	Job Role								
Software Development (Highly Relevant for Retail Industry)	<table border="1"> <tr> <td>Software Development Manager</td> <td>Senior DevOps Engineer</td> </tr> <tr> <td>Senior Software Architect</td> <td>Technical Lead – Software Development</td> </tr> <tr> <td>Senior Software Development Engineer</td> <td>Manager, System Software</td> </tr> <tr> <td>Senior Cyber Security Engineer</td> <td>Application Development Manager</td> </tr> </table>	Software Development Manager	Senior DevOps Engineer	Senior Software Architect	Technical Lead – Software Development	Senior Software Development Engineer	Manager, System Software	Senior Cyber Security Engineer	Application Development Manager	39%	<ul style="list-style-type: none"> Principal Cloud Engineer Principal Software Engineer Principal Systems Engineer
Software Development Manager	Senior DevOps Engineer										
Senior Software Architect	Technical Lead – Software Development										
Senior Software Development Engineer	Manager, System Software										
Senior Cyber Security Engineer	Application Development Manager										
Hardware Engineering	<table border="1"> <tr> <td>Senior Mechatronics Manager</td> <td>Senior Mechanical Engineer</td> </tr> <tr> <td>Manager, Hardware Engineering</td> <td>Senior Hardware Architect</td> </tr> <tr> <td>Senior Robotics Engineer</td> <td>Senior Hardware Design Engineer</td> </tr> </table>	Senior Mechatronics Manager	Senior Mechanical Engineer	Manager, Hardware Engineering	Senior Hardware Architect	Senior Robotics Engineer	Senior Hardware Design Engineer	22%	<ul style="list-style-type: none"> Principal Hardware Engineer Principal Robotics Engineer 		
Senior Mechatronics Manager	Senior Mechanical Engineer										
Manager, Hardware Engineering	Senior Hardware Architect										
Senior Robotics Engineer	Senior Hardware Design Engineer										
Network Engineering	<table border="1"> <tr> <td>Manager of Network Engineering</td> <td>Lead Network Engineer</td> </tr> <tr> <td>Senior Network Engineer</td> <td>Network Architect</td> </tr> <tr> <td>Senior VoIP Solutions Engineer</td> <td>Network Facilities Engineer II</td> </tr> </table>	Manager of Network Engineering	Lead Network Engineer	Senior Network Engineer	Network Architect	Senior VoIP Solutions Engineer	Network Facilities Engineer II	18%	<ul style="list-style-type: none"> Principal Network Engineer 		
Manager of Network Engineering	Lead Network Engineer										
Senior Network Engineer	Network Architect										
Senior VoIP Solutions Engineer	Network Facilities Engineer II										
Embedded Engineering	<table border="1"> <tr> <td>Technical Lead – Embedded Development</td> <td>Senior Electrical Engineer</td> </tr> <tr> <td>Senior Firmware Manager</td> <td>Embedded Linux Kernel Engineer</td> </tr> <tr> <td>Senior Embedded Systems Engineer</td> <td>Senior Imaging Embedded - FW Engineer</td> </tr> </table>	Technical Lead – Embedded Development	Senior Electrical Engineer	Senior Firmware Manager	Embedded Linux Kernel Engineer	Senior Embedded Systems Engineer	Senior Imaging Embedded - FW Engineer	12%	<ul style="list-style-type: none"> Principal Engineer Embedded Software Principal Electrical Engineer Principal Firmware Engineer 		
Technical Lead – Embedded Development	Senior Electrical Engineer										
Senior Firmware Manager	Embedded Linux Kernel Engineer										
Senior Embedded Systems Engineer	Senior Imaging Embedded - FW Engineer										
Others (Data, Research, Infrastructure)	<table border="1"> <tr> <td>Senior Data Architect</td> <td>Senior Research Engineer</td> </tr> <tr> <td>Lead Infrastructure Engineer</td> <td>Senior Database Engineer</td> </tr> <tr> <td>Senior Process Automation Engineer</td> <td>Senior Geotechnical Engineer</td> </tr> <tr> <td>Staff Systems Engineer</td> <td>Senior Modelling Lead</td> </tr> </table>	Senior Data Architect	Senior Research Engineer	Lead Infrastructure Engineer	Senior Database Engineer	Senior Process Automation Engineer	Senior Geotechnical Engineer	Staff Systems Engineer	Senior Modelling Lead	9%	<ul style="list-style-type: none"> Principal Research Engineer
Senior Data Architect	Senior Research Engineer										
Lead Infrastructure Engineer	Senior Database Engineer										
Senior Process Automation Engineer	Senior Geotechnical Engineer										
Staff Systems Engineer	Senior Modelling Lead										

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Note : Draup analysed 6,000+ profiles from various job families to analyze talent profiles based on past and current designation, location and skills
 Software Development includes Search and Information Retrieval, Operating Systems, Cyber Security. Hardware Engineering includes robotics.

Draup has analysed over 1,000+ profiles to understand and validate the actual job roles transitions



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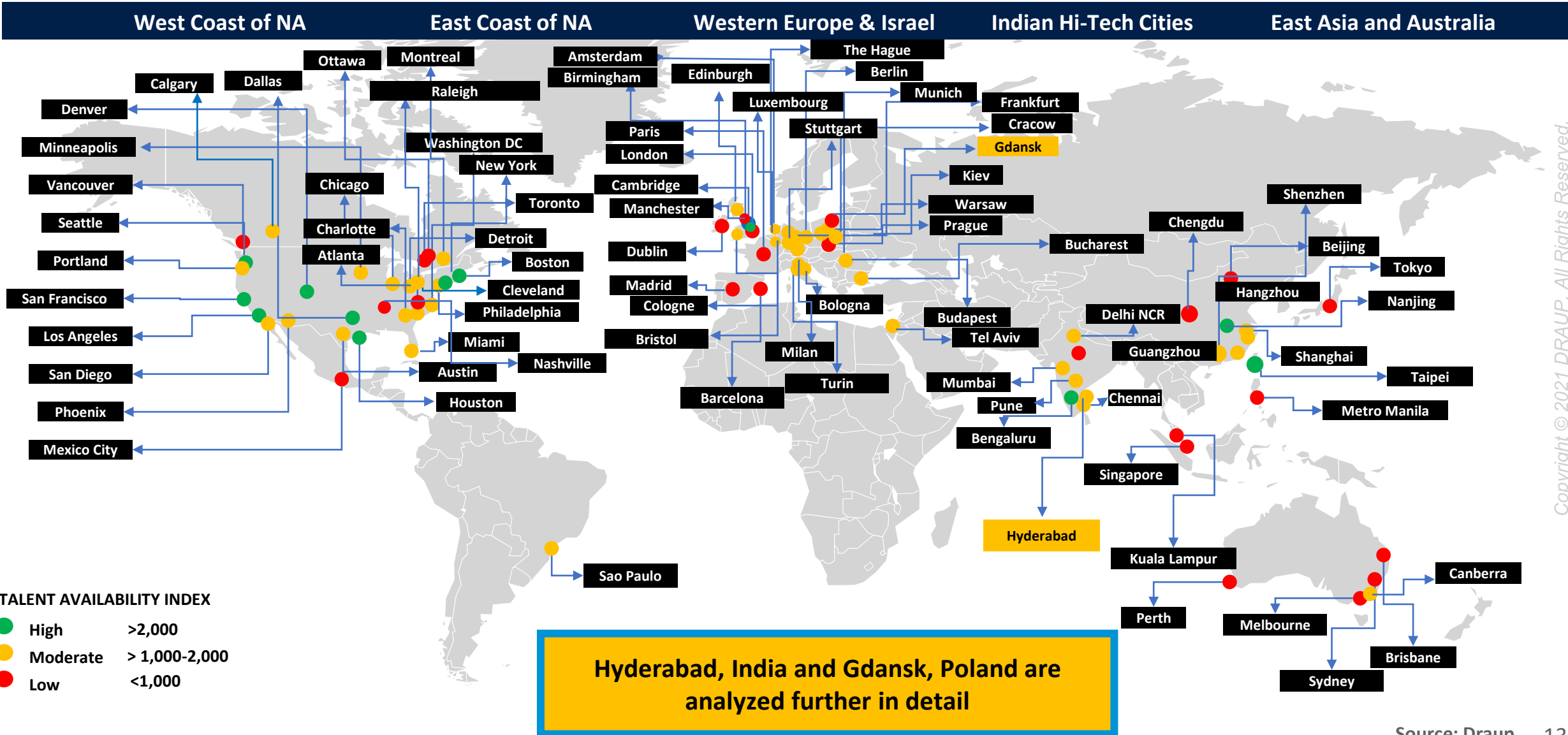
- **Location intelligence for Principal Engineer talent**

1. Principal Engineer – Global Talent Hotspot analysis
2. Location Deep-dive of Hyderabad, India and Gdansk, Poland
3. Top Hiring Companies and compensation analysis

Principal Engineer – Global Talent Hotspot: San Francisco Bay Area, Bengaluru, Boston, and Los Angeles are some of the top global locations with high number of Principal Engineer talent pool. **Hyderabad and Gdansk**, some of the emerging locations for Principal Engineer talent pool, have been analysed in detail



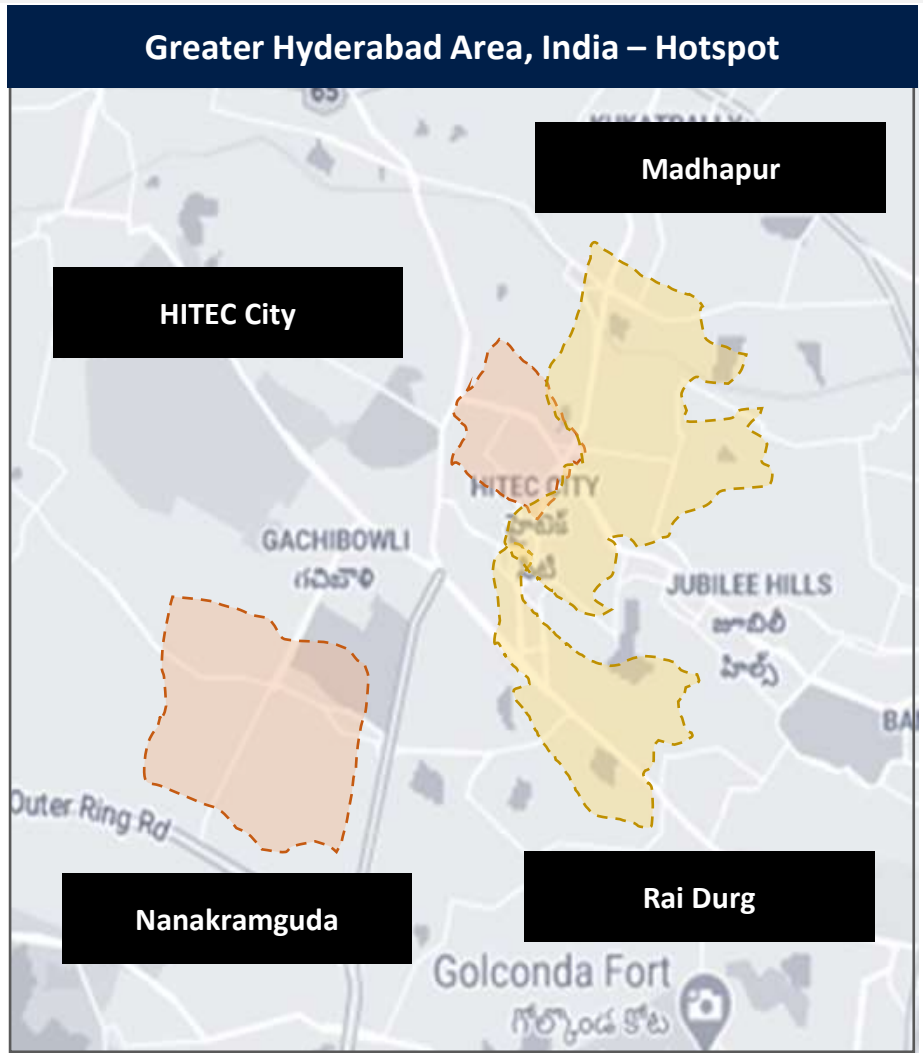
Draup has identified 100+ Principal Engineer Hotbeds across the globe



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Draup's proprietary talent module was used to identify hotspots for Principal Engineering

Hotspot Location Analysis – Hyderabad, India (1/2): HITEC City and Nanakramguda are the major hotspots in Greater Hyderabad Area with the presence of top companies such as Microsoft, Oracle, Google, Apple and Broadcom Inc



Major Hotspots (Orange solid outline) Other Hotspot (Yellow dashed outline)

Talent Availability	🟡
Fresh Talent	🟡
Talent Quality	🟢
Talent Growth	🟡
Median Cost	🟢
Ease of Hiring	🟡
Regulatory Cost	🟢
Infrastructure Cost	🟡
Start up Index	🟢

🟢 Early findings raise no concerns 🟡 Limited concerns, likely not significant

GEOGRAPHY	TOP TECH EMPLOYERS
HITEC City	Oracle, Dell EMC, Broadcom, Microsoft, Qualcomm, Pegasystems Inc, Hewlett Packard Enterprise, Intel Corporation, Google
Nanakramguda	DBS Bank, CA Technology – A Broadcom Company, Apple Development Center
Other Hotspot	Salesforce, MathWorks, Wells Fargo, AT&T, Intuit

Location Characteristics

Business Considerations			Location Attributes		
Business Cost	Business costs relative to Europe average	Low	Demographics	Population	10 Mn
	Effective Corporate tax rate (Low/Moderate/High)	Medium		Annual Population Growth	2.7%
Commercial Real Estate	Real Estate cost	\$1,136/sq.m	Quality of life	Cost of living	\$333/month
	Commercial real estate vacancy rate	9.2%		Quality of Living	Low
				Avg. Commute time (One Way)	26 min
			Gender Diversity	Gender Ratio (M/F)	95:100

Source: Cushman and Wakefield, Statista website, Numbeo database, Central Statistics Office,

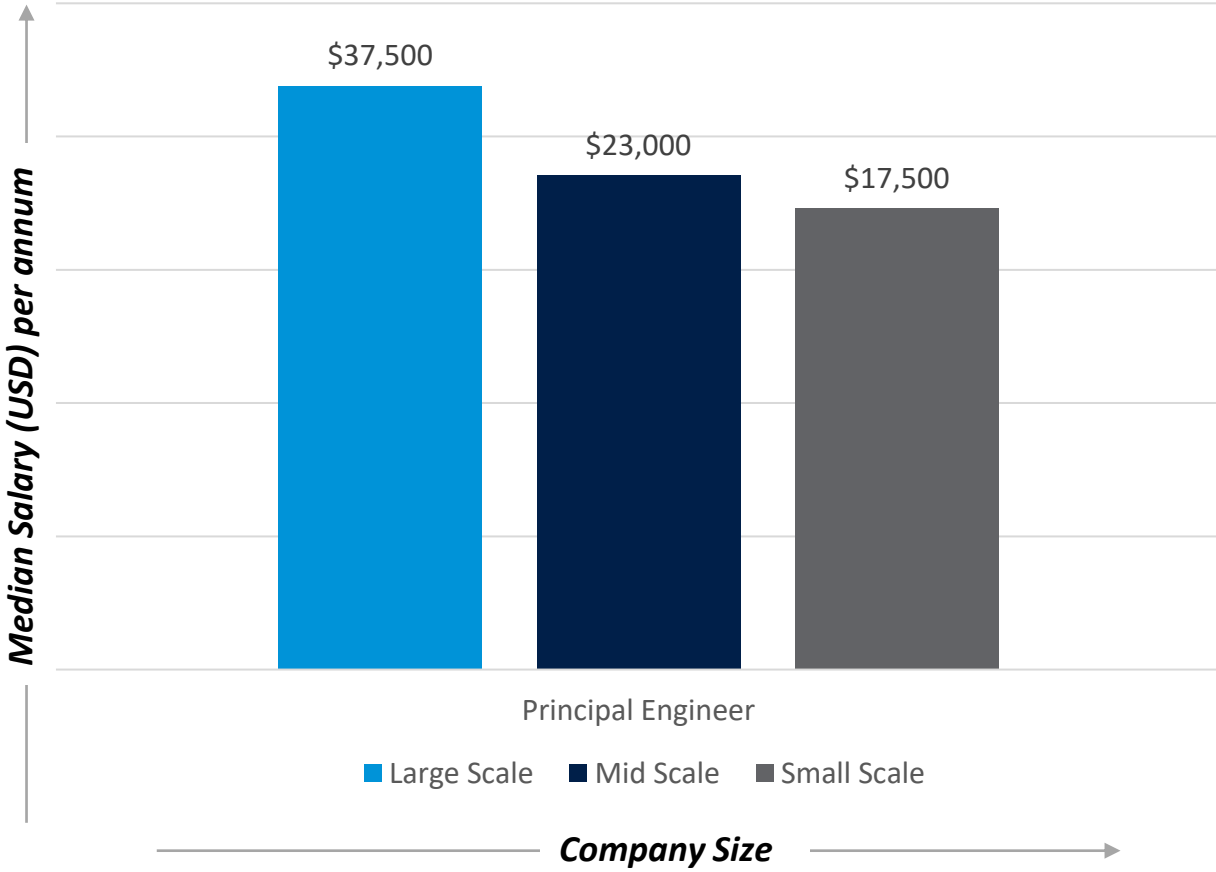
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Principal Engineer Median Base Pay in (USD)



\$32,700

Median Talent Cost of a Principal Engineer

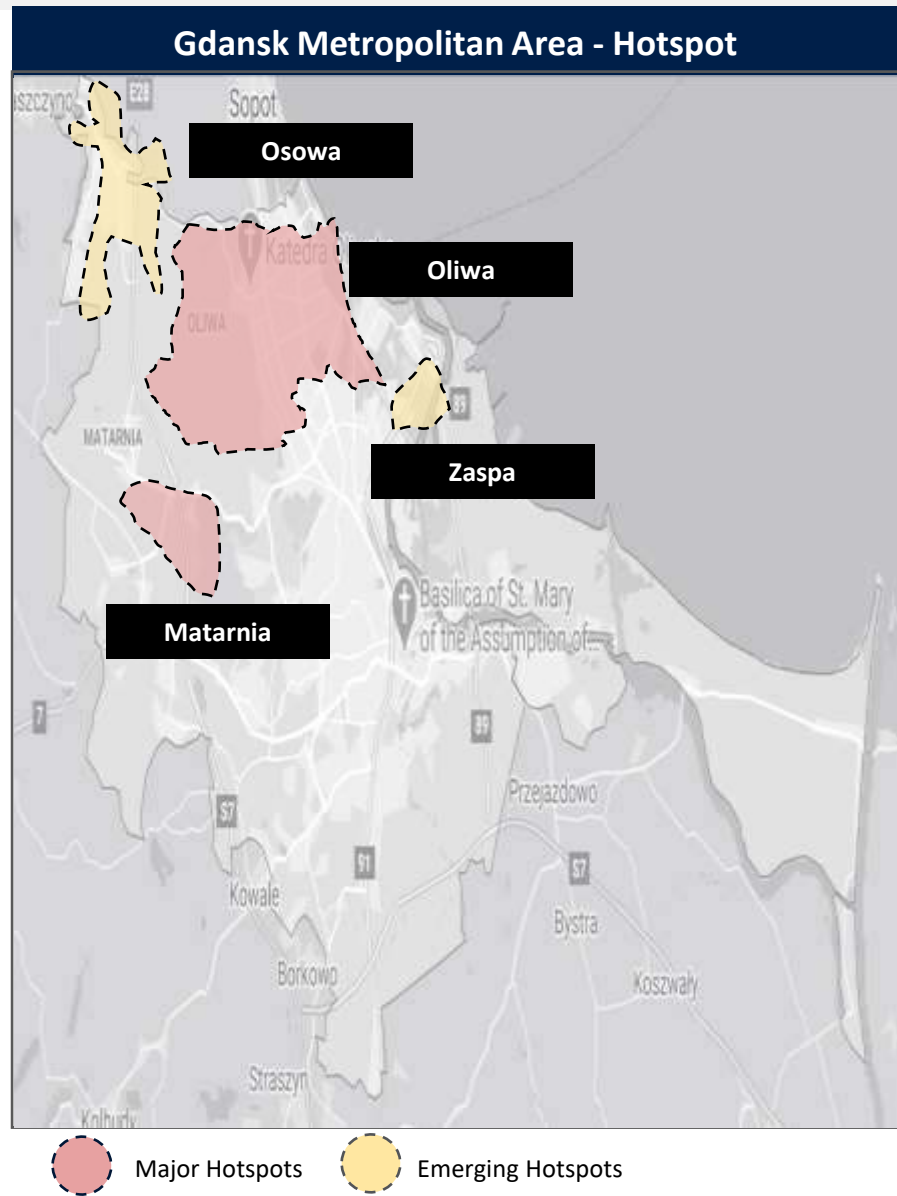


Note: Draup Talent Cost Modular was used to analyse the represented data
 Note: Bonus and stock options are calculated with respect to the base pay. Total Equity aggregates grant date fair value of stock and option awards and long-term incentives granted during the fiscal year (2019 – 2020)

Top Employers	(Relevant Talent Pool)	
	Talent Size	Common Job Titles
	300	Principal Software Engineer Principal Applications Engineer Principal Software Quality Assurance Engineer
	210	Principal Engineer - IC Design Senior Principal Engineer Senior Principal Software Engineer
	120	Senior Principal Engineer Senior Principal Software Engineer Sr. Principal Engineer, Cloud Enable - IT Architecture
	80	Principal Engineer Principal Software Development Engineer Principal Network Engineer Manager
	49	Principal Engineer/Manager Principal Software Engineer/Manager

Top Companies	Base Pay	Variables Breakup	
	\$40,000	\$5,000	\$7,000
	\$34,540	\$7,550	\$3,370
	\$33,290	\$2,840	NA
	\$30,850	\$1,855	\$3,180
	\$50,200	\$10,010	\$5,025

Hotspot Location Analysis – Gdansk, Poland (1/2): Oliwa and Matarnia are the major hotspot with the presence of top employers such as ADVA, Flex, Spartez, and Intel Corporation in Gdansk Metropolitan Area, Poland



- Talent Availability 🟡
- Fresh Talent 🟡
- Talent Quality 🟢
- Talent Growth 🟡
- Median Cost 🟢
- Ease of Hiring 🟡
- Regulatory Cost 🟢
- Infrastructure Cost 🟡
- Start up Index 🟡

🟢 Early findings raise no concerns 🟡 Limited concerns, likely not significant

GEOGRAPHY	TOP EMPLOYERS
Oliwa	Nordea, Spartez, Alior bank, State Street, Thomson Reuters, Kemira
Matarnia	Intel Corporation, ABB, Rockwell Automation

Location Characteristics

Business Considerations			Location Attributes		
Business Cost	Business costs relative to US average	Moderate	Demographics	Population	470,900
	Effective Corporate tax rate (Low/Moderate/High)	Moderate		Annual Population Growth	1.1%
Commercial Real Estate	Real Estate cost	\$4,248/ sq.m	Quality of life	Cost of living	\$1,960/Month
	Commercial real estate vacancy rate	4.9%		Quality of Living	High
			Gender Diversity	Avg. Commute time (One Way)	30 min
				Gender Ratio (M/F)	94:100

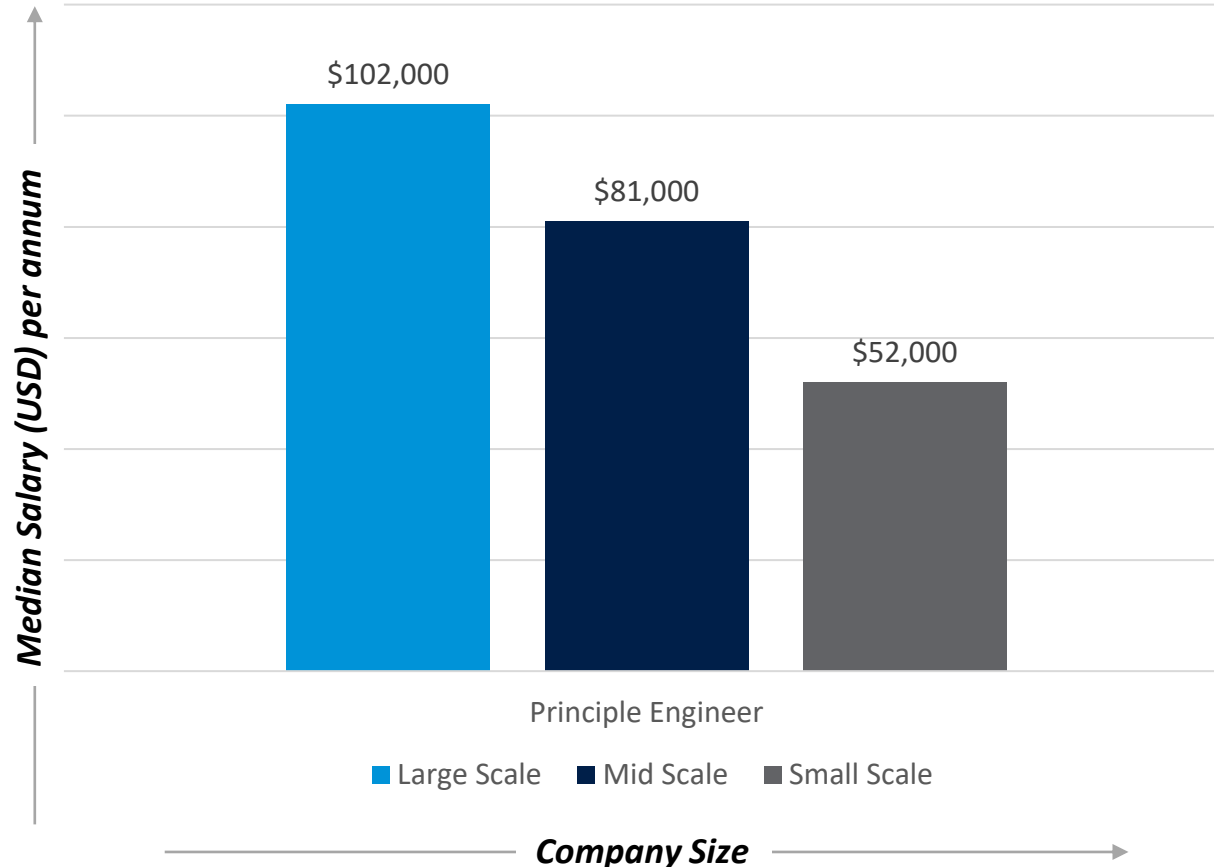
Source: Cushman and Wakefield, Statista website, Numbeo database, Central Statistics Office,

Principal Engineer Median Base Pay in (USD)



\$ 78,300

Median Talent Cost of a Principal Engineer



Top Employers	(Relevant Talent Pool)	
	Talent Size	Common Job Titles
	20	Principal Software Engineer Principal Engineer R&D System Principal Application Engineer
	15	Principal Software Engineer Principal Firmware Engineer
	10	Principal Engineer – Fault Finding Principal Engineer - Telematics
	10	Senior Principal Engineer – Software Principal Software Engineer Principal Java Developer

Top Companies	Base Pay	Variables Breakup	
	\$106,000	\$6,300	NA
	\$87,300	\$4,100	NA
	\$98,100	NA	NA
	\$86,100	NA	NA
		Bonus	Equity

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Note: Draup Talent Cost Modular was used to analyse the represented data
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About Draup

Draup Capabilities & Data Assets



EMPOWERS DECISION MAKING IN

Location Assessment

Strategic Workforce Planning

Peer Benchmarking

University Relations

Recruitment

Compensation & Benefits

Diversity & Inclusion

Mergers and Acquisitions

and diverse other use cases...

Draup for Location Intelligence: Draup analyzes 4,500+ job roles across 2,500+ locations to help companies understand talent ecosystem with insights around talent cost, required skills, job demand, and peers



50M+

DIGITAL AND DIGITALLY
INFLUENCED
PROFESSIONALS

4.5K+

JOB ROLES

300K+

PEER GROUP
COMPANIES

33

INDUSTRIES

65M+

JOB
DESCRIPTIONS

100K+

COURSES

2.5K+

LOCATIONS

7K+

UNIVERSITIES

4M+

CAREER PATHS
ANALYZED

30K

SKILLS

7K+

DIGITAL TOOLS &
PLATFORMS

30K+

UNIVERSITY PROFESSORS

52

MACHINE LEARNING
MODELS DEVELOPED

10M+

DAILY DATA POINTS
ANALYZED

100+

LABOR STATISTICS
DATABASES

1000+

CUSTOM TALENT
REPORTS



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