How to Hire Back-End Developers: The Definitive Guide

HackerRank

Hire Top Back-End Developers

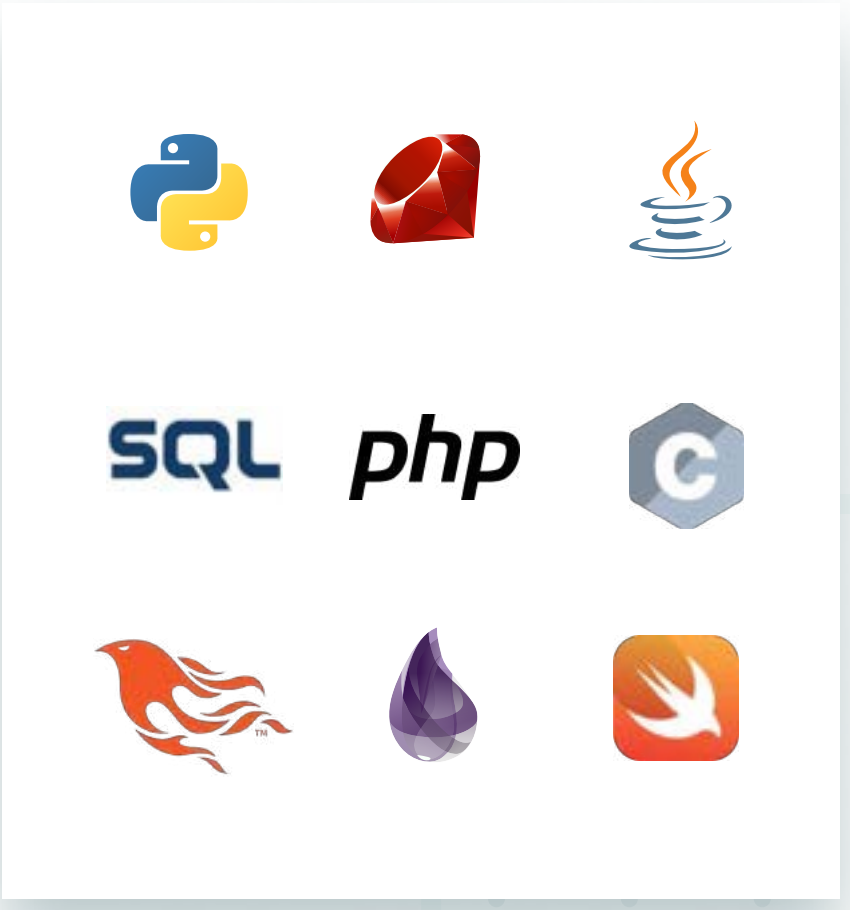
Back-end development is a growing and in-demand skill set essential to technical teams in every industry. In this guide, you'll gain key insights into hiring back-end developers to set your team up for success.

Introduction

Without back-end developers, the internet as we know it wouldn't exist. A complex system of databases, servers, and architectures sits behind every website you visit and application you use. Back-end developers are responsible for building the infrastructure that brings this expanding digital realm to life. But connecting to individuals with that skill set is easier said than done.

To hire the best back-end developers, tech teams need to recruit better than every business out there. They need to cultivate stellar candidate experiences through efficient and effective hiring processes. And they need to hone their storytelling skills to engage with back-end developers who are strong fits for the opportunity at hand.

In this guide, we break down everything you need to know about hiring back-end developers. From attracting top developers to evaluating candidates to join your team, you'll gain key hiring insights you won't find anywhere else.



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1 Back-End Development 101

Back-end development is a branch of computer programming dealing with the server-side infrastructure of websites. Back-end developers use programming languages such as Python, Java, and SQL to build the servers, databases, and security of websites and web-based applications.

On a more technical level, the core job responsibilities of back-end developers include:

- Coding in server-side programming languages
- Supporting the full application lifecycle
- Building automation tools
- Building and integrating APIs
- Working in an agile environment
- Troubleshooting, debugging, and optimizing performance
- Keeping up-to-date with advancements in technology

Key Terminology

Back-end development is an advanced discipline with its own set of technologies, terms, and jargon. A hiring team with fluency over technical concepts will have an advantage while recruiting for back-end roles.

Core technical concepts include:

Agile: An iterative approach to project management and software development.

AI: Artificial intelligence. At its most basic, that means the ability of a digital computer to perform tasks associated with intelligent beings.

Algorithm: A set of rules followed in calculations or problem-solving operations.

API: Application program interface. A connection that computers and applications use to communicate.

Container: A standard unit of software that packages code and all its dependencies.

Framework: A platform that provides a foundation for developing software applications.

Language: A set of rules used to control the actions and behavior of a computer.

ML: Machine learning. The development of computer systems that are able to learn and adapt without following explicit instructions.

Object-oriented programming: A technology for writing programs that are made up of self-sufficient modules that contain all of the information needed to manipulate a given data structure.

Open-source software: Software for which the original source code is made freely available.

Relational database: A database structured to recognize relations among stored items of information.

Key Programming Languages

Back-end developers use a range of programming languages to develop websites and applications. While there are a number of languages used in the field of web development, an individual back-end developer might only learn a few languages that align with their specialization, interests, and career path.

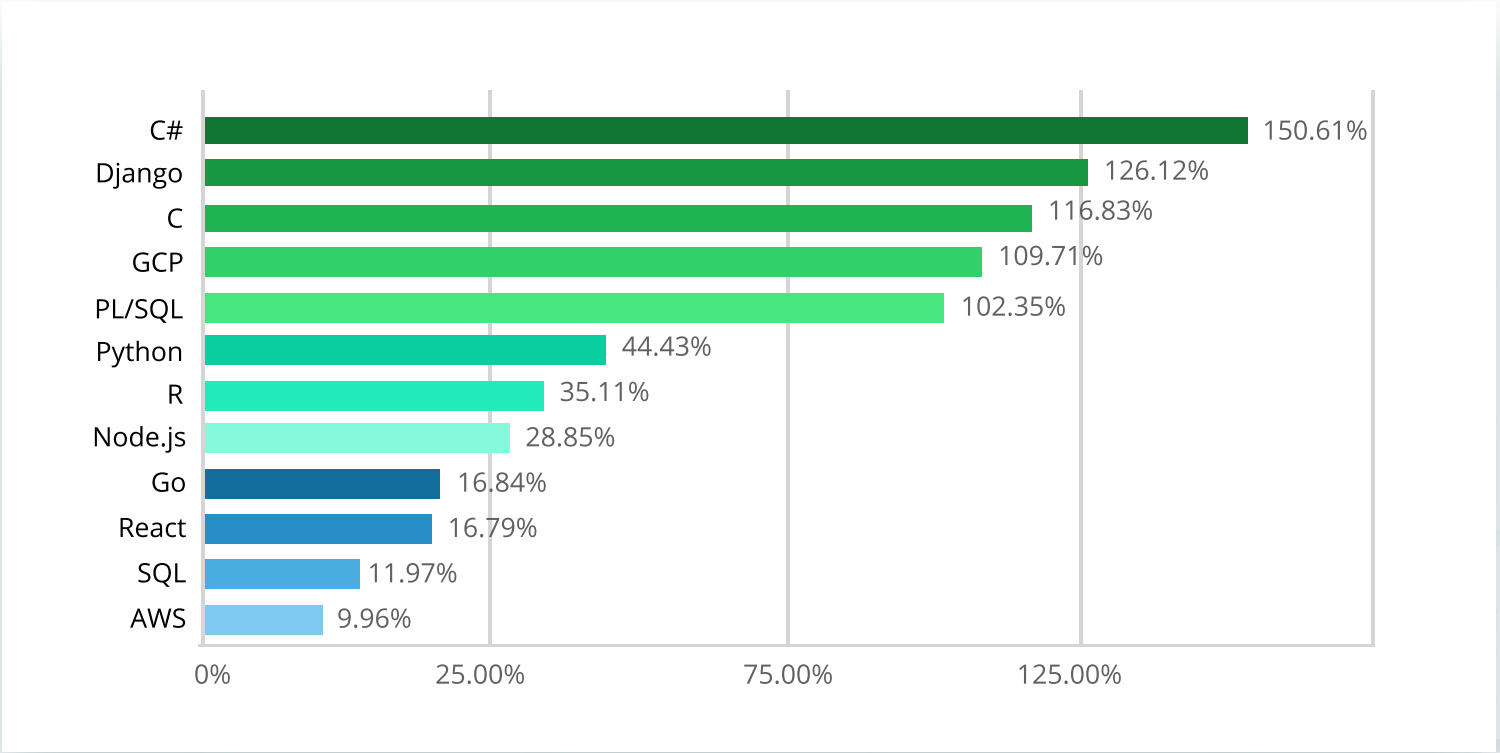
C/C++ General purpose and compiled programming languages that are statically typed. C++ is an extension of C with the functionality of user-defined data classes.	**C#** A general purpose, object-oriented programming language developed around 2000 by Microsoft as part of its .NET initiative.	**Go** A popular general-purpose language invented by Google for networking and infrastructure.
Java A high-level programming language used to create complete applications.	**PHP** A widely-used, open-source, general-purpose scripting language that is particularly suited for web development.	**Python** An interpreted, high-level programming language. Popular for rapid development across multiple platforms.
Ruby An interpreted, dynamic, open-source programming language with a focus on simplicity and productivity.	**Scala** A high-level programming language that combines object-oriented and functional programming.	**SQL** An industry-standard query language that works with relational databases.

Employer Demand for Back-End Skills

Back-end developers are vital members of technical teams, which have consistent demand for their skill sets. However, employer demand for specific languages, frameworks, and tools shifts with market trends and technological innovation.

Below is a chart depicting the increase in the number of technical skill assessments that developers completed for job applications in 2021 on HackerRank. It's worth noting that this is not a representation of trends in the skills that developers are learning. Rather, it's indicative of what skills employers are testing and hiring for.

Change in Number of Screening Assessments (Q1-Q4 2021)



Beyond the Resume

Back-end developers solve complex challenges, collaborate with other developers, and communicate with non-technical stakeholders. To succeed in a back-end role, new hires need to have skills that aren't easily represented on a resume. Your ability to assess these four key competencies will help you identify great developers during the interviewing process — and make better hires.

Code Quality

When multiple developers work on the same codebase, it's important for them to follow best practices to avoid committing unintentional pattern and syntax errors. Quality code is clear, bug-free, documented, and in compliance with the team's best practices.

Language Proficiency

Language proficiency refers to the developer's ability to understand all of the rules, features, and mechanisms of a programming language, and optimize for simplicity and accuracy.

Problem Solving

Solving problems is a foundational skill for computer science. Developers need to understand how to solve a problem, understand how to translate this "algorithm" into something a computer can do, and write the specific code to implement the solution.

Technical Communication

Technical communication is used to make technical information clear, concise, and understandable. Throughout their careers, developers in back-end roles have to interface with non-technical stakeholders and may need to train employees on how to operate systems they've built.

Emerging Trends

Go

Go, often referred to as Golang, is an object-oriented programming language invented by Google in 2009. Go is now a general purpose language used in a wide range of applications. Despite the language being over a decade old, interest in Go has continued to grow. From 2018 to 2020, Go was the number one language developers wanted to learn. Companies such as Uber, Twitch, Dropbox — and yes, Google — use Go in their tech stacks.

GraphQL

GraphQL is an open-source data query and manipulation language developed by Meta in 2012. Neither a front-end or back-end language, GraphQL can be thought of as a language between the two environments that facilitates the exchange of information. Despite being over a decade old, global interest in GraphQL has been trending for the last three years. While GraphQL is widely used by front-end developers, GraphQL is also a powerful language back-end developers can use to stitch together functionality and deliver more intuitive APIs.

Backend as a Service	Django	Elixir	Go
GraphQL	Headless CMS	Nest.js	Node.js
Phoenix	Serverless Applications	Spring	Static Site Generators

Source 1, Source 2, Source 3

Sample Back-End Developer Job Description

The job descriptions for back-end roles can vary widely, depending on the responsibilities, compensation, and seniority of the position. That said, there are commonalities between descriptions that you can take advantage of. Here's an example of a job description for a mid-level back-end development role.

Title: Back-End Developer II
Full-time. Associate.

Responsibilities:

Development: Responsible for creating, coding, and optimizing servers, databases, and server-side applications.

Delivery: Agile delivery of solutions aligned to business needs while maintaining a high standard of quality.

Collaboration: Partner with product owners to understand business and product requirements and translate them into engineering solutions.

Qualifications

Basic Qualifications

- Programming experience with at least two software programming languages
- 3-5 years of experience in software development
- BS/BA degree or equivalent experience

Required Qualifications

- 3+ years of hands-on development experience with Java, Python, or Go
- 3+ years of experience with SQL and relational databases (Oracle, MySQL)
- Experience with REST API design, implementation, and documentation
- Knowledge of industry-wide technology trends and best practices

Other Desired Skills

- Understanding of front-end languages such as JavaScript and CSS
- Experience with AWS frameworks

2 Role Demographics

Today's back-end developers come from backgrounds that span a wide range of experiences and professional histories. Back-end developers as a whole are a large, diverse, and fast-growing workforce experiencing high job satisfaction and strong career outlook.

It's worth noting that developers with a back-end skill set may identify with broader job titles such as software developer or software engineer. Because of this, the number of back-end developers is likely underreported.

160,000+

Number of Developers with Back-End Skills in the US

Source: Linkedin Recruiter

680,000

Number of Developers with Back-End Skills Worldwide

Source: LinkedIn Recruiter

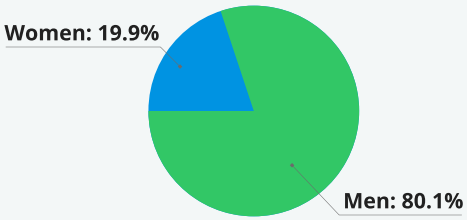
203,000+

Number of Open Back-Developer Positions

Source

Back-End Developer Statistics

Gender Distribution in the US



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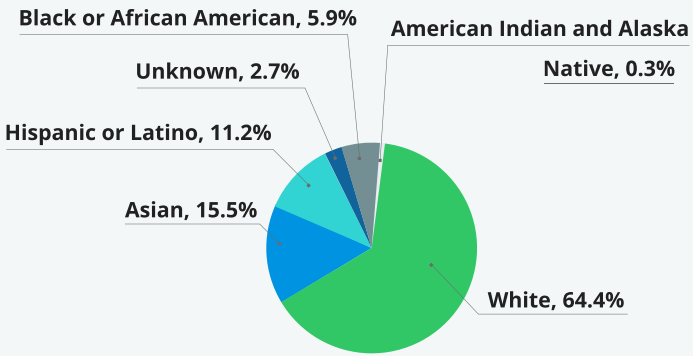
Race Distribution in the US



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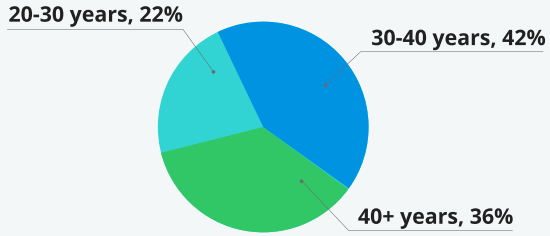
Age Breakdown in the US



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Experience

After skill, the most important qualification for back-end developers is experience. For many employers, on-the-job experience and training is an essential requirement.

Larger companies that employ a significant number of back-end developers tend to use well-defined structures and pay grades for their seniority levels.

A senior developer at Google, for example, might occupy the pay grade of L5. For the purpose of this guide, we are focusing on years of job-related experience. It's also worth noting that many leading tech firms refer to their back-end developers as software engineers.

Career Levels at Leading Tech Companies

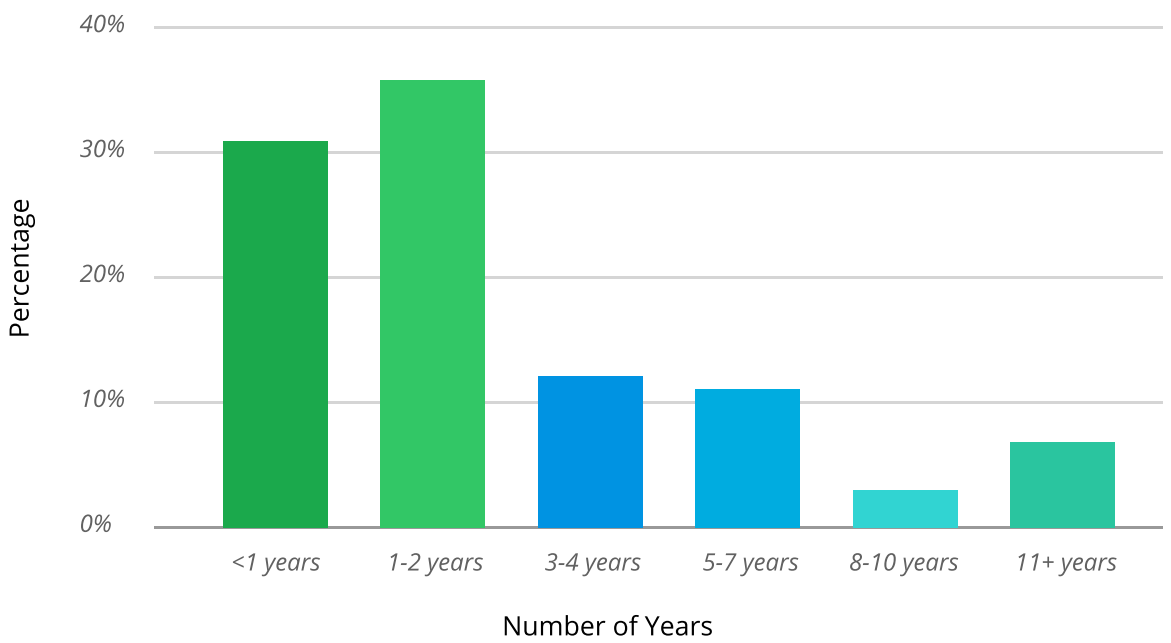
Google	Apple	Meta	Amazon
L3 - SWE II	ICT3 - Junior Software Engineer	E3	SDE I - L4
L4 - SWE III	ICT3 - Software Engineer	E4	SDE II - L5
L5 - Senior SWE	ICT4 - Senior Software Engineer	E5	SDE III (Senior SDE) - L6
L6 - Staff SWE	ICT5	E6	Principal SDE- L7
L7 - Senior Staff SWE	ICT6	E7	Senior Principal SDE (L8)
L8 - Principal Engineer	Distinguished Engineer	E8	Distinguished Engineer (L10)
L9 - Distinguished Engineer	Senior Distinguished Engineer	E9	
L10 - Google Fellow	Engineering Fellow		

Source

Tenure

Across industries, back-end developers tend to move between roles frequently. Across the board, 31 percent of back-end developers stay in their companies for less than one year, while 36 percent stay for one to two years.

Average Tenure of Back-End Developers



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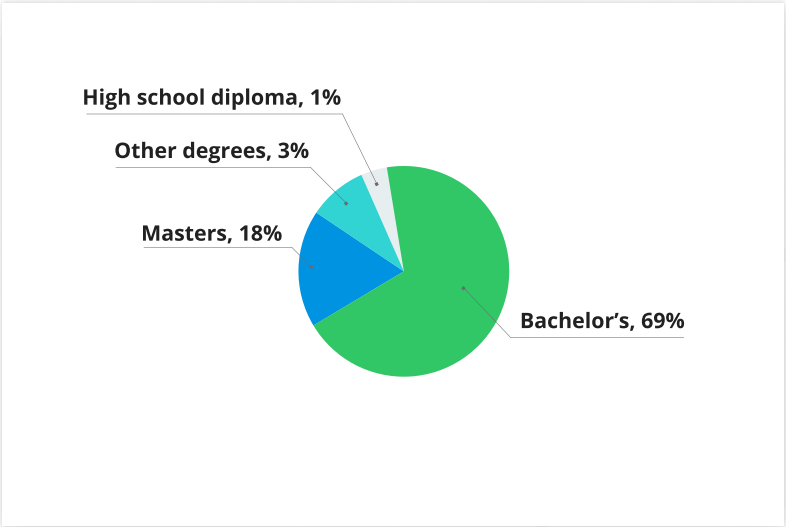
Education

About 87 percent of back-end developers have a bachelor's degree or higher. When recruiting, interviewing, or hiring developers, there's a high likelihood that many of the candidates will have a degree. And many companies still require developers to hold four-year degrees.

While the majority of developers have degrees, competition for talent is driving employers to prioritize real-world skills and explore a larger talent pool. And the ranks of developers trained through bootcamps, online training, and self-directed programs are growing. For example, a survey by Course Report found that from 2013 to 2020 the number of developers graduating from bootcamps increased by 1,046 percent.

Back-End Developer Degree Levels



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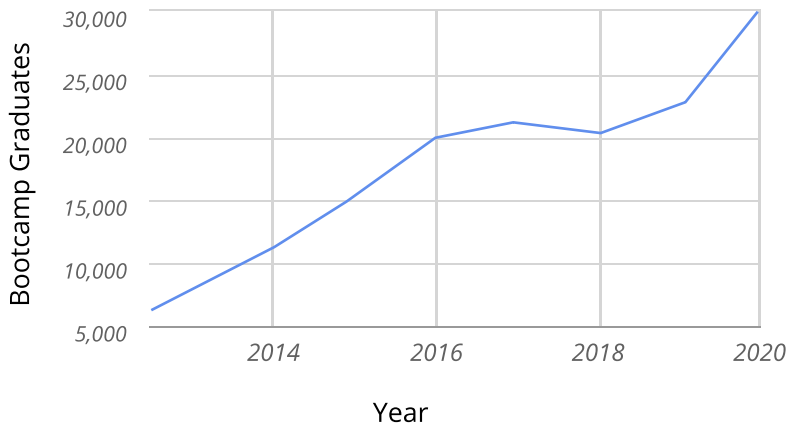
Coding Bootcamp Growth (2013-2020)



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Back-End Developer Compensation

On average, back-end developers receive highly competitive compensation packages. However, data sources on developer salaries often present vastly different, and at times conflicting, numbers at both a national and global level. The average base salary for back-end developers in the U.S. is $116,605. But some estimates place the global median much higher at $143,000.

The compensation packages of back-end developers occupy a wide range. Salary aggregator levels.fyi lists common back-end developer salaries ranging from $91,000 to $293,000. And developers with expertise in focus areas such as machine learning and API development command even higher compensations.

Back-end developer salaries can vary based on a number of factors, including experience level, skill requirements, industry, location, and company size.

Back-End Developer Salaries on levels.fyi

AREA OF FOCUS	25TH PERCENTILE	50TH PERCENTILE	75TH PERCENTILE	90TH PERCENTILE
Web Development	$91,000	$143,000	$200,776	$293,000
API Development	$102,000	$125,000	$206,000	$278,750
Machine Learning	$162,000	$227,000	$320,000	$440,000

Source 1, Source 2, Source 3

3 Screening Back-End Developer Candidates

Assessing the back-end developers joining your team is critical. That said, it can be challenging to screen candidates in a way that focuses on the technical skills needed to perform the job at hand.

The best way to do so is using strong screening strategies that evaluate candidates' technical skills. Resumes are traditionally an important part of hiring technical talent, but teams looking to hire the right developers for their open roles usually supplement the resume screen with a skills assessment to gauge the candidate's real-world technical skills.

In this section, we'll break down key components of the evaluation stage, with a focus on assessing back-end developer skills to find the right talent for your team.

Skill Assessments and Take-Home Tests

Skill assessments are used to evaluate a candidate's technical skills and proficiencies, and they're one of the essential elements of the hiring process.

The timing of the skill assessment may vary, but assessments early in the process help recruiters advance candidates with the real-world skills required for the job. Providing assessments early in the process can also help with identifying the most promising developers in the applicant pool.

Skill assessments of back-end developers can cover a wide range of subjects, including:

- Coding
- Problem solving
- Databases
- Work simulation
- Algorithms
- Data structures
- Dynamic programming

Depending on the role, employers may also evaluate additional skills, including debugging, domain knowledge, and logical reasoning.

An assessment's ability to evaluate skills depends on the authority of the screening platform, the quality of the questions, and how the developer's experience has been considered in the assessment environment.

Back-end development coding challenges and technical questions should assess the candidate's skills and ability to solve problems at a difficulty level appropriate for the role.

Screening Pro Tip

Referring back to the results of a skill assessment during interviews can be a great way to ground the conversation with the candidate.

Sample Skill Assessment Question

Below is an example of the type of question an employer might ask a back-end developer to solve during an assessment. This question gives candidates the opportunity to work with REST APIs and perform related requests such as filtering or sorting data as well as returning correct status codes.

Question: REST API

Implement REST APIs to perform filter and sort operations on a collection of Products. Each event is a JSON entry with the following keys:

- barcode : the unique id of the product (String)
- price : the price of the product (Integer)
- discount : the discount % available on the product(Integer)
- available : the availability status of the product (0 or 1)

Here is an example of a product JSON object:

```
[ {
  "barcode": "74002423",
  "item": "Shawl",
  "category": "Accessories",
  "price": 758,
  "discount": 12,
  "available": 1
 } ]
```

You are provided with the implementation of the models required for all the APIs. The task is to implement a set of REST services that exposes the endpoints and allows for filtering and sorting the collection of product records in the following ways:

GET request to /filter/price/{initial_range}/{final_range} :

- returns a collection of all products whose price is between the initial and the final range supplied.
- The response code is 200, and the response body is an array of products in the price range provided.
- In case there are no such products return status code 400.

GET request to /sort/price :

- returns a collection of all products sorted by their pricing.
- The response code is 200 and the response body is an array of the product names sorted in ascending order of price.

Complete the given project so that it passes all the test cases when running the provided unit tests.

4 Interviewing for Real-World Skills

Technical interviews are fundamental to finding and assessing great back-end developers. However, many of the traditional strategies for interviewing candidates are insufficient for evaluating the increasingly complex skills of technical professionals. Putting the right effort into and emphasis on technical interviews is key to hiring for the right skill sets.

Currently, the tech industry is in the process of transitioning from coding interviews based on algorithm-style challenges to hiring experiences built around real-world developer skills. Hiring teams that focus on the application of skills in real-world job scenarios are making better hires and delivering a better interview experience for developers.

In this section, we'll break down the types of technical interview questions your team might use during various interview rounds.

Technical Interview Round

After a back-end candidate has moved on from the screening stage, they'll usually encounter a live technical interview that gauges their problem-solving skills and proficiency in the languages and frameworks required for the role.

The specific skills a back-end developer will need to demonstrate during this stage vary depending on the employer. Back-end interviews at Amazon, for example, focus on work simulation, coding, data structures, and algorithms. Apple, in contrast, focuses on domain knowledge and coding ability.

The questions that make up a technical interview are important to assessing a candidate's real-world skills. The interview questions companies use to evaluate back-end developers can cover a wide range of subjects, including programming, algorithms, data structures, and technical communication.

Interviewing Best Practice

Investing in a strong integrated development environment goes a long way in making interview set up easy and giving developers all of the tools they need.

Sample Technical Interview Question

Below is one example of the kind of problems a back-end developer might face during a technical interview. This question gives candidates the opportunity to demonstrate their problem solving skills and ability to work with greedy algorithms.

Question: Cut Them All

An automated cutting machine is used to cut rods into segments. The cutting machine can only hold a rod of minLength or more. A rod is marked with the necessary cuts and their lengths are given as an array in the order they are marked. Determine if it is possible to plan the cuts so the last cut is from a rod at least minLength units long.

Example

The rod is initially sum(lengths) = 4 + 3 + 2 = 9 units long. First, cut off the segment of length 4 + 3 = 7 leaving a rod 9 - 7 = 2. Then check that the length 7 rod can be cut into segments of lengths 4 and 3. Since 7 is greater than or equal to minLength = 7, the final cut can be made. *Return "Possible".*

n = 3
lengths = [4, 3, 2]
minLength = 7

Function Description
Complete the function *cutThemAll* in the editor.
cutThemAll has the following parameter(s):

- *int lengths[n]:* the lengths of the segments, in order
- *int minLength:* the minimum length the machine can accept

Returns
string: "Possible" if all *n-1* cuts can be made.
Otherwise, return the string *"Impossible"*

Constraints
2 ≤ n ≤ 105
1 ≤ t ≤ 109
1 ≤ lengths[i] ≤ 109
The sum of the elements *of lengths equals* the uncut rod length

System Design Interview Round

In addition to a coding interview, many hiring teams include a system design round. A system design interview is a type of interview that challenges candidates to design a back-end system, often on a physical or virtual whiteboard. Candidates are asked to explain their solution and thought process as they develop their answer.

More commonly found in hiring processes for senior-level roles, this stage grants candidates a look into the organization's tech stack and operations, and gives hiring teams an understanding of the candidate's approach to problem solving. These interviews should ideally proceed like discussions, with the candidate thinking aloud about scalability, storage, reliability, and other aspects of the system.

System design interviews are considered one of the more difficult types of interviews. They require a fundamental understanding of systems and advanced preparation to succeed. By their nature, system design questions are broad, open-ended questions with a variety of possible answers. The interviewer receives discussion points for guiding the interview and a suggested solution, not a correct solution.

Potential system design prompts include:

- Design a ride-sharing service
- Design a video streaming service
- Design a URL shortening service
- Design a file-storing and sharing service
- Design a simple social media application

Sample System Design Interview Question

Below is one example of the kind of problems a back-end developer might face during a system design interview. This question gives candidates the opportunity to demonstrate their ability to design and build integrated and scalable systems.

Question: Flash Sale

Your company has launched a hot new product. The marketing team has recommended promoting it through flash sales. The features of a flash product sale are as follows:

1. The sale starts at a particular time.
2. The requests to purchase the product may be greater than the stock count for the product.
3. Each user can purchase only one unit of the product.
4. There is no "Add to Cart" functionality.
5. Each order should be placed on a first-come-first-serve basis. The product should go out of stock the moment the entire stock of the product is exhausted

Using diagramming tools, design a system that implements these features in a robust, scalable way.

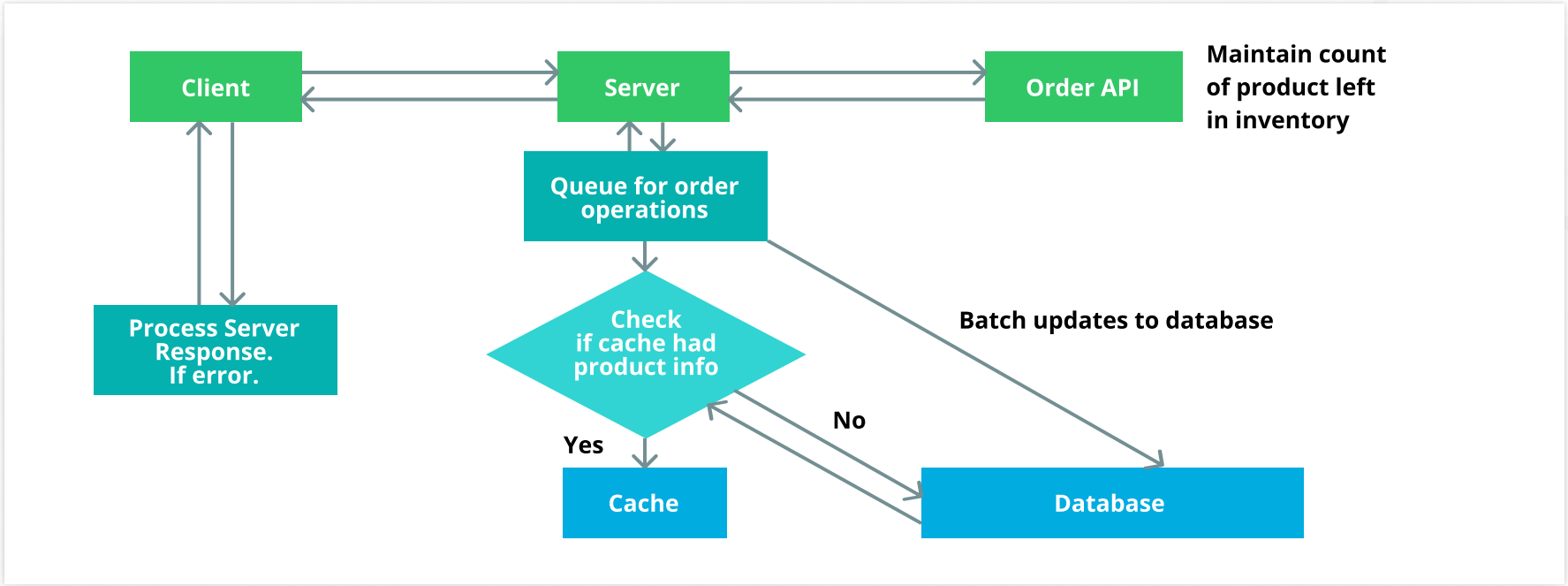
System Design Interview Pro Tip

Give candidates a challenge similar to the problems they'd be solving in the role they're interviewing for. This will get them excited about the opportunity and give interviewers direct insight into the skills they'd bring to the role.

System Design Interviewer Guidelines

- As soon as the user clicks the add to cart button, trigger an API call and show a loader until the API returns a response.
- The API at the backend needs to process the requests in the queue.
  - If the request count is greater than the stock available, return an error instantly with a 'no stock' error.
  - Otherwise, just return a response with success, the order id, and in the background, keep processing the queue.

- At the frontend: stop the loader upon receiving a response.
  - If there is an error, show the appropriate error and remove the product from the list.
  - If successful, show the success status.



5 Hiring Best Practices

A back-end developer's hiring experience has a major impact on their interest in the role — and your ability to hire them. A company that provides a world-class candidate experience will have an advantage in screening, interviewing, and hiring the right candidate for the role. Here are three best practices you should follow while hiring developers.

Hiring Senior-Level Professionals

Hiring senior back-end developers is a fundamentally different challenge than hiring early-career and mid-level professionals. The competition for senior-level talent is fierce, and many senior professionals are already employed. With a limited market for this experience level, few companies get enough passive applications at the senior level.

Hiring managers and recruiters with ambitious hiring goals need to rely on strategic outreach and internal referrals. To further this initiative, consider supporting your outbound sourcing strategy with the principles of account-based marketing. In this model, talent acquisition works to identify candidates who aren't on the job market and reach out through networks and social channels.

Outreach should be highly compelling and personalized. Assume the candidate already earns a lofty salary and receives dozens of similar inquiries. To catch their interest, you'll need to anticipate their career goals and motivations, connect on a personal level, and develop a storytelling strategy to encourage engagement.

Hiring managers will also want to conduct an early call with the candidate to sell the opportunity and generate enough interest for the candidate to want to move forward in the conversation.

Another adjustment is to replace the skill assessment with a more strategic take-home project that focuses on a real-world technical challenge a back-end developer might encounter on the job.

DEI Best Practice: Job Description Language

Increasing diversity, equity and inclusion (DEI) in the workplace has become a high-priority initiative for tech companies. While back-end developers already come from a diverse range of backgrounds, recruiters and hiring managers can help further this initiative by integrating DEI into every stage of their recruitment process, starting with sourcing.

The language you use to construct a job description has a significant influence on a candidate's opinion about the company. One survey found that 55% of candidates consider job descriptions as one of the most important factors when deciding if a company's a good fit.

An inclusive job description speaks to diverse applicants while being specific about the skill sets required. Leading with inclusive language shows candidates your organization is serious about inclusivity and helps attract applicants to roles they might not otherwise apply for.

Demographics	Exclusive Language	Inclusive Language
Nationality	Must be a native English speaker	Must have fluency in English
Disability	Visually inspect code for accuracy	Review code for accuracy
Gender	He/she	They, you
Culture	Cultural fit	Cultural add, value alignment
Age	Work hard/play hard, digital native	Dynamic atmosphere, inclusive environment, technical fluency

Source

DEI Best Practice: Screen Out PII

Many hiring managers use a resume-first process to begin assessing candidates. The problem is that resumes often contain a candidate's personally identifiable information (PII), like name, email, school, employment history, and more. Hiring managers may unconsciously use this information to assume demographic information, including age, race, gender, ethnicity, and nationality. The result is the unintentional introduction of unconscious bias into the hiring process.

Screening out PII allows hiring managers to review the candidate's skills and work history before seeing any personal or demographic information. This helps the hiring manager focus on the application without unconscious bias getting in the way. When using any resume screening or skill assessment tool, it's important to look for options that allow hiring teams to screen out PII.

Examples of Personally Identifiable Information

Conclusion

If you've made it to the end of this guide, you're now prepared to take on the challenge of hiring the world's most talented and in-demand developers. We've broken down the fundamentals of back-end development, how to find and hire developers, and how to deliver a first-class candidate experience. But there is still work to be done.

The world's need for back-end developers is vast, but the number of available developers is finite. And it will remain so for the foreseeable future. For years to come, hiring teams and recruiters will continue to optimize their processes to hire faster, better, and smarter. Each day will present new challenges, along with endless opportunities.