
Column: Careers in Cybersecurity, rewarding, challenging, critical

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Cybersecurity is defined by the U.S. Cybersecurity and Infrastructure Agency as “the art of protecting networks, devices, and data from unauthorized access or criminal use and the practice of ensuring confidentiality, integrity, and availability of information.”

According to the Encyclopedia Britannica, those working in cybersecurity strive to address four main threats: theft of data; vandalism, including the destruction of data by a computer virus; fraud; and invasion of privacy, such as the illegal accessing of protected personal financial or medical data.

Cybersecurity has become increasingly important in recent years due to the increased reliance on computers, the Internet, Bluetooth, and Wi-Fi as well the widespread adoption of smart devices such as smartphones and smart TVs. Cybersecurity work isn't limited to a single occupation. Many occupations incorporate one or more aspects of cybersecurity work to keep information safe. Those working in cybersecurity must continue to learn and evolve to remain ahead of potential threats.

Cybersecurity Encompasses Several Occupations

As information is collected and distributed in multiple ways, most computer occupations primarily responsible for other tasks still play a role in cybersecurity. For example, a web developer's main objective may be to design a website where users can access the information or services they need but they may also be responsible for securing confidential information from being accessed via the site. Likewise, a software developer may be primarily responsible for creating a product that customers use but may also be tasked with ensuring the software's source code cannot be stolen or manipulated.

Computer user support specialists may teach internal staff at an organization how to secure information on their devices and avoid digital threats such as phishing attempts, in addition to performing tasks such as helping staff resolve other computer-related issues. There are also occupations dedicated primarily to cybersecurity:

Information security analysts plan, upgrade, or monitor security measures for the protection of computer networks and information. Many ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. Information security analysts may also respond to security breaches and viruses.

All other computer occupations, a catch-all for occupations that don't fit neatly into any of the other computer occupations, contains several detailed occupations directly related to cybersecurity such as penetration testers, information security engineers, digital forensics analysts, and blockchain engineers.

Penetration testers evaluate network system security by conducting simulated internal and external cyberattacks using adversary tools and techniques. They attempt to breach and exploit critical systems and gain access to sensitive information to assess system security.

Information security engineers develop and oversee the implementation of information security procedures and policies. They build, maintain and upgrade security technology, such as firewalls, for the safe use of computer networks and the transmission and retrieval of information. Information security engineers also design and implement appropriate security controls to identify vulnerabilities and protect digital files and electronic infrastructure, and monitor and respond to computer security breaches, viruses, and intrusions, and perform forensic investigation.

Digital forensics analysts conduct investigations on computer-based crimes establishing documentary or physical evidence, such as digital media and logs associated with cyber intrusion incidents. They analyze digital evidence and investigate computer security incidents to derive information in support of system and network vulnerability mitigation. Digital forensics analysts also preserve and present computer-related evidence in support of criminal, fraud, counterintelligence, or law enforcement investigations.

Blockchain engineers maintain and support distributed and decentralized blockchain-based networks or block-chain applications such as cryptocurrency exchange, payment processing, document sharing, and digital voting. They design and deploy secure block-chain design patterns and solutions over geographically distributed networks using advanced technologies. They may also assist with infrastructure setup and testing for application transparency and security.

Strategic roles in management that deal with the governance, risk assessment, and compliance aspects of cybersecurity exist within the computer and information systems managers occupation.

High-wage, High-Skill, and High-Demand

Cybersecurity occupations require education beyond high school. According to O*NET, information security analysts, penetration testers, information security engineers, digital forensics analysts, and blockchain engineers all typically require a bachelor's degree. In addition to a four-year degree, cybersecurity related occupations often require IT certifications such as the Certified Information Systems Security Professional (CISSP) certification. As new security measures are implemented, bad actors work quickly to circumvent them. Because of this, those who work in the cybersecurity field must continuously learn and adopt new methods to protect against emerging threats.

Due to an increased reliance on technology, cybersecurity occupations are in high demand. The information security analyst occupation is expected to have nearly 1,400 job openings in Oregon from 2021 to 2031 and grow by 33%, much faster than all occupations in Oregon (13%) and computer occupations overall (16%).

All other computer occupations – which includes penetration testers, information security engineers, digital forensic analysts, and blockchain testers – is expected to grow by 11% and have more than 3,200 job openings statewide from 2021 to 2031, more than four times the typical number of openings (733) for an occupation in Oregon during the same period.

Cybersecurity occupations, like most computer occupations, pay a high wage. Information security analysts earn median wages more than twice the median for all occupations statewide, at roughly \$105,000 annually as of 2022. The median wage for occupations falling under the broad all other computer occupations category is roughly \$82,700. The management side of cybersecurity may offer even higher wages, with a \$132,200 median annual wage for computer and information systems managers. This compares with a median wage of \$48,800 for all occupations statewide.

Conclusion

Cybersecurity work spans several occupations that are high paying and are in high demand, as companies, governmental organizations, and other entities seek to protect against digital threats. A career in cybersecurity can prove rewarding for those who enjoy practical problem solving and life-long learning. To learn more about opportunities in cybersecurity, visit the National Initiative for Cybersecurity Careers and Studies' site for information on career pathways and education and training programs.

Sarah Cunningham is an Oregon Employment Department Projections Economist. She may be reached at sarah.e.cunningham@employ.oregon.gov, or at 503-871-0046.