
Occupation-Specific Information - Computer Network Architect

<https://www.onetonline.org/link/summary/15-1241.00>

Job-Description

Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning, including analysis of capacity needs for network infrastructures. May also design network and computer security measures. May research and recommend network and data communications hardware and software.

Sample of reported job titles: Design Engineer, Network Analyst, Network and Security Engineer, Network Consultant, Network Systems Consultant, Networking Systems and Distributed Systems Engineer, Solutions Architect, Telecommunications Analyst

Tasks

- Occupation-Specific Information
- Tasks
- Develop or recommend network security measures, such as firewalls, network security audits, or automated security probes.
- Develop disaster recovery plans.
- Monitor and analyze network performance and reports on data input or output to detect problems, identify inefficient use of computer resources, or perform capacity planning.
- Coordinate network or design activities with designers of associated networks.
- Develop conceptual, logical, or physical network designs.
- Develop and implement solutions for network problems.
- Determine specific network hardware or software requirements, such as platforms, interfaces, bandwidths, or routine schemas.
- Communicate with system users to ensure accounts are set up properly or to diagnose and solve operational problems.

-
- Visit vendors, attend conferences or training sessions, or study technical journals to keep up with changes in technology.
 - Evaluate network designs to determine whether customer requirements are met efficiently and effectively.
 - Participate in network technology upgrade or expansion projects, including installation of hardware and software and integration testing.
 - Adjust network sizes to meet volume or capacity demands.
 - Prepare detailed network specifications, including diagrams, charts, equipment configurations, or recommended technologies.
 - Develop network-related documentation.
 - Estimate time and materials needed to complete projects.
 - Supervise engineers or other staff in the design or implementation of network solutions.
 - Coordinate network operations, maintenance, repairs, or upgrades.
 - Develop procedures to track, project, or report network availability, reliability, capacity, or utilization.
 - Research and test new or modified hardware or software products to determine performance and interoperability.
 - Communicate with customers, sales staff, or marketing staff to determine customer needs.
 - Prepare design presentations and proposals for staff or customers.
 - Design, build, or operate equipment configuration prototypes, including network hardware, software, servers, or server operation systems.
 - Prepare or monitor project schedules, budgets, or cost control systems.
 - Develop plans or budgets for network equipment replacement.
 - Coordinate installation of new equipment.
 - Explain design specifications to integration or test engineers.
 - Develop or maintain project reporting systems.
 - Use network computer-aided design (CAD) software packages to optimize network designs.
 - Maintain or coordinate the maintenance of network peripherals, such as printers.

-
- Develop and write procedures for installation, use, or troubleshooting of communications hardware or software.
 - Communicate with vendors to gather information about products, alert them to future needs, resolve problems, or address system maintenance issues.
 - Maintain networks by performing activities such as file addition, deletion, or backup.
 - Design, organize, and deliver product awareness, skills transfer, or product education sessions for staff or suppliers.

Technology Skills

- Access software – Access management software; Citrix cloud computing software; Remote access software
- Administration software – Cisco Systems CiscoWorks; Element management software; Netreo OmniCenter; Riverbed Technology;
- Analytical or scientific software – Discrete event simulation software; Minitab Hot technology ; Root cause analysis software; The MathWorks MATLAB Hot technology
- Application server software – Docker Hot technology ; Microsoft Windows Server Hot technology ; Red Hat OpenShift Hot technology ; Spring Boot Hot technology
- Authentication server software – Microsoft Forefront Identify Manager
- Backup or archival software – Computer Associates ArcServ Backup; System and data disaster recovery software; Veritas NetBackup
- Bridge software – Network bridge software
- Business intelligence and data analysis software – Apache Spark Hot technology ; MicroStrategy Hot technology ; Oracle Business Intelligence Enterprise Edition Hot technology ; Qlik Tech QlikView Hot technology
- Cloud-based data access and sharing software – Microsoft SharePoint Hot technology
- Related occupations

-
- Cloud-based management software – Amazon Web Services AWS CloudFormation Hot technology ; IBM WebSphere Hot technology ; IBM WebSphere MQ; Splunk Enterprise Hot technology
 - Cloud-based protection or security software – SolarWinds
 - Communications server software – Email management software; IBM Domino
 - Computer aided design CAD software Hot technology – Autodesk AutoCAD Hot technology ; Autodesk Revit Hot technology ; Dassault Systemes CATIA; Dassault Systemes SolidWorks Hot technology
 - Computer based training software
 - Configuration management software – Chef; Perforce Helix software; Puppet Hot technology ; VMware Hot technology
 - Content workflow software – Atlassian JIRA Hot technology
 - Data base management system software – Amazon DynamoDB Hot technology ; Apache Hive Hot technology ; Elasticsearch Hot technology ; MongoDB Hot technology
 - Data base reporting software – Microsoft SQL Server Reporting Services SSRS; Network reporting software
 - Data base user interface and query software – Amazon Elastic Compute Cloud EC2 Hot technology ; Amazon Redshift Hot technology ; Oracle JDBC Hot technology ; Transact-SQL Hot technology
 - Desktop communications software – BroadSoft BroadWorks
 - Development environment software – Apache Ant Hot technology ; Apache Kafka Hot technology ; Common business oriented language COBOL Hot technology ; Go Hot technology
 - Electronic mail software – IBM Notes Hot technology ; Microsoft Exchange Hot technology
 - Enterprise application integration software – Atlassian Bamboo Hot technology ; Extensible markup language XML Hot technology ; IBM InfoSphere DataStage; Oracle Fusion Middleware Hot technology
 - Enterprise resource planning ERP software Hot technology – Microsoft Dynamics Hot technology ; Oracle Fusion Applications; SAP business and customer relations management software

-
- Enterprise system management software – IBM Power Systems software
 - Expert system software – Ansible software Hot technology
 - File versioning software – Apache Subversion; Git Hot technology
 - Financial analysis software – Oracle E-Business Suite Financials
 - Geographic information system – ESRI ArcGIS software Hot technology
 - Graphics or photo imaging software – Adobe Systems Adobe Fireworks; Trimble SketchUp Pro Hot technology
 - Helpdesk or call center software – Help desk software; Ticket information tracking software
 - Human resources software – Human resource management software HRMS
 - Industrial control software – Supervisory control and data acquisition SCADA software Hot technology
 - Instant messaging software – Blink
 - Internet browser software – Web browser software
 - Internet directory services software – Domain name system DNS; Microsoft Active Directory
 - Internet protocol IP multimedia subsystem software – Multiprotocol Label Switching MPLS; Open Shortest Path First OSPF; Session Initiation Protocol SIP; Voice over internet protocol VoIP system software Hot technology
 - LAN software – Local area network LAN software
 - Metadata management software – CA Erwin Data Modeler
 - Network monitoring software – Nagios Hot technology ; Network intrusion prevention systems NIPS; Symantec Intruder Alert; Wireshark Hot technology
 - Network operating system enhancement software – Compuware dynaTrace; Infoblox NetMRI; Silver Peak; Wide area network WAN optimization software
 - Network security and virtual private network VPN equipment software – Content filter software; Firewall software; Network intrusion detection software
 - Network security or virtual private network VPN management software – Intrusion prevention system IPS; LogRhythm; Network and system vulnerability assessment software; Virtual private networking VPN software Hot technology

-
- Object or component oriented development software – Advanced business application programming ABAP Hot technology ; Apache Groovy Hot technology ; jQuery Hot technology ; Scala Hot technology
 - Object oriented database management software – Hibernate ORM; PostgreSQL Hot technology
 - Office suite software – Microsoft Office Hot technology
 - Operating system software – Bash Hot technology ; Oracle Solaris Hot technology ; Red Hat Enterprise Linux Hot technology ; UNIX Shell Hot technology
 - Optical network management software
 - Pattern design software – Diagramming software
 - Portal server software – Apache HTTP Server Hot technology
 - Presentation software – Microsoft PowerPoint Hot technology
 - Process mapping and design software – Microsoft Visio Hot technology
 - Program testing software – Hewlett Packard LoadRunner; JUnit Hot technology ; Segue SilkPerformer; Selenium Hot technology
 - Project management software – Confluence Hot technology ; Microsoft Project Hot technology
 - Requirements analysis and system architecture software – Capacity planning software; Network architecture design software; Requirements management software; Unified modeling language UML Hot technology
 - Spreadsheet software – Microsoft Excel Hot technology
 - Storage networking software – Amazon Simple Storage Service S3 Hot technology ; Network storage software; Storage area network SAN software; Storage management software
 - Switch or router software – Border Gateway Protocol BGP; Cisco Systems Cisco Web Cache Communication Protocol WCCP; Transparent Interconnection of Lots of Links TRILL; Virtual Router Redundancy Protocol VRRP
 - Time accounting software – Time reporting software
 - Transaction security and virus protection software – CA eTrust; McAfee VirusScan; NortonLifeLock cybersecurity software; Ping Identity

-
- Transaction server software – Customer information control system CICS
 - Video conferencing software – Cisco Webex; Videoconferencing software
 - Video creation and editing software – Adobe Systems Adobe After Effects Hot technology
 - WAN switching software and firmware – Wide area network WAN software
 - Web platform development software – Django Hot technology ; Google AngularJS Hot technology ; Microsoft ASP.NET Core MVC Hot technology ; Spring Framework Hot technology
 - Word processing software – Microsoft Word Hot technology

Detailed Work Activities

- Working with Computers – Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Analyzing Data or Information – Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.
- Making Decisions and Solving Problems – Analyzing information and evaluating results to choose the best solution and solve problems.
- Updating and Using Relevant Knowledge – Keeping up-to-date technically and applying new knowledge to your job.
- Identifying Objects, Actions, and Events – Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.
- Getting Information – Observing, receiving, and otherwise obtaining information from all relevant sources.
- Processing Information – Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.
- Communicating with Supervisors, Peers, or Subordinates – Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Interpreting the Meaning of Information for Others – Translating or explaining what information means and how it can be used.

-
- Thinking Creatively – Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.
 - Documenting/Recording Information – Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.
 - Evaluating Information to Determine Compliance with Standards – Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
 - Providing Consultation and Advice to Others – Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.
 - Organizing, Planning, and Prioritizing Work – Developing specific goals and plans to prioritize, organize, and accomplish your work.
 - Communicating with People Outside the Organization – Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
 - Developing Objectives and Strategies – Establishing long-range objectives and specifying the strategies and actions to achieve them.
 - Estimating the Quantifiable Characteristics of Products, Events, or Information – Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.
 - Monitoring Processes, Materials, or Surroundings – Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.
 - Developing and Building Teams – Encouraging and building mutual trust, respect, and cooperation among team members.
 - Judging the Qualities of Objects, Services, or People – Assessing the value, importance, or quality of things or people.
 - Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment – Providing documentation, detailed instructions, drawings, or specifications to tell others about how

devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.

- Establishing and Maintaining Interpersonal Relationships – Developing constructive and cooperative working relationships with others, and maintaining them over time.
- Guiding, Directing, and Motivating Subordinates – Providing guidance and direction to subordinates, including setting performance standards and monitoring performance.
- Training and Teaching Others – Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others.
- Coaching and Developing Others – Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills.
- Coordinating the Work and Activities of Others – Getting members of a group to work together to accomplish tasks.
- Resolving Conflicts and Negotiating with Others – Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others.

Detailed Work Activities

- Develop computer or information security policies or procedures.
- Recommend changes to improve computer or information systems.
- Maintain contingency plans for disaster recovery.
- Analyze data to identify or resolve operational problems.
- Monitor the performance of computer networks.
- Coordinate project activities with other personnel or departments.
- Maintain computer networks to enhance performance and user access.
- Develop models of information or communications systems.
- Develop specifications for computer network operation.
- Provide technical support for computer network issues.
- Resolve computer network problems.
- Update knowledge about emerging industry or technology trends.

-
- Evaluate project designs to determine adequacy or feasibility.
 - Install computer hardware.
 - Install computer software.
 - Modify software programs to improve performance.
 - Document network-related activities or tasks.
 - Estimate time or monetary resources needed to complete projects.
 - Supervise information technology personnel.
 - Conduct research to gain information about products or processes.
 - Test computer hardware performance.
 - Collaborate with others to determine design specifications or details.
 - Communicate project information to others.
 - Configure computer networks.
 - Design integrated computer systems.
 - Manage budgets for appropriate resource allocation.
 - Manage financial activities of the organization.
 - Coordinate software or hardware installation.
 - Develop information communication procedures.
 - Manage documentation to ensure organization or accuracy.
 - Maintain computer hardware.
 - Develop testing routines or procedures.
 - Collaborate with others to resolve information technology issues.
 - Teach others to use computer equipment or hardware.
 - Evaluate utility of software or hardware technologies.
 - Install computer software.
 - Maintain computer equipment or software.