ORIGIN ACADEMY · COURSE SYLLABUS

Network Protocol Developer

Design, implement and test network protocols in C: sockets, TCP/IP internals, RFCs, application and IoT protocols, TLS and high-performance I/O.

24 weeks · about 12 hours a week · live cohort of up to 10
Curriculum last updated 18 November 2026

Availability

This course opens soon. Join the waitlist on the course page to hear first about dates and prices.

Before you start

- C programming (our C Programming course)
- Comfort with the Linux command line
- English good enough to follow technical documentation and live sessions: about a credit (C6 or better) in WASSCE or NECO English Language, or an equivalent such as KCSE or IGCSE English (roughly CEFR level B1). You don't need the certificate: Phase 0 is free, so you can check for yourself
- A laptop running Linux, macOS, or Windows with WSL

How the course works

- A live cohort of up to 10 students, with a mentor.
- At least half your time is hands-on: every module ends with a lab.
- Live sessions are recorded, so you can rewatch them or catch up.
- Questions between sessions are answered within 24 hours on weekdays.
- A mentor reviews every phase project, like a pull request at work.

Phase 0 is free for everyone, before you enroll.

Curriculum

PHASE 0 · WEEKS 1–3 · FREE

Networking Fundamentals

The OSI and TCP/IP models, Ethernet, ARP, IPv4 and IPv6, subnetting, NAT, routing basics, DHCP and DNS from first principles.

- OSI and TCP/IP models
- Ethernet, MAC addresses and ARP
- IPv4, IPv6, CIDR and subnetting
- NAT and private addressing
- Routing basics: static routes, OSPF and BGP
- DHCP and DNS

You build: Packet-by-packet walkthrough of a web request

PHASE 1 · WEEKS 4–6

Sockets Programming in C

BSD sockets, byte order, blocking and non-blocking I/O, select and poll.

- The BSD sockets API
- Byte order and getaddrinfo
- TCP clients and servers
- UDP sockets
- Non-blocking I/O with select and poll

You build: Multi-client chat server

PHASE 2 · WEEKS 7–8

Packet Analysis

Wireshark, tcpdump, libpcap and writing dissectors.

- Wireshark and tcpdump
- Capturing with libpcap
- Writing a Wireshark dissector

You build: Custom Wireshark dissector

PHASE 3 · WEEKS 9–11

TCP & UDP Deep Dive

Handshakes, flow and congestion control, retransmission and reliable delivery over UDP.

- The TCP state machine
- Flow control and congestion control
- Retransmission and timers
- Designing reliability over UDP

You build: Reliable transfer protocol over UDP

PHASE 4 · WEEKS 12–15

Implementing from RFCs

Reading RFCs, binary parsers, state machines and interoperability testing, using DNS, DHCP and HTTP as worked examples.

- How to read an RFC
- Binary parsers and encoders
- Protocol state machines
- Worked example: a DNS resolver
- HTTP/1.1 and WebSocket
- Interoperability testing

You build: Spec-compliant protocol implementation

PHASE 5 · WEEKS 16–18

Industrial & IoT Protocols

MQTT, CoAP, Modbus and CAN for embedded and industrial systems.

- MQTT
- CoAP

- Modbus
- CAN

You build: MQTT broker or Modbus gateway

PHASE 6 · WEEKS 19–20

Security & TLS

Cryptography basics, TLS handshakes, certificates, VPN tunnels and fuzzing protocol parsers.

- Cryptography for protocol engineers
- TLS 1.3 handshakes and certificates
- Tunnels: IPsec and WireGuard
- Fuzzing protocol parsers
- Common network attacks

You build: Fuzzed, TLS-secured service

PHASE 7 · WEEKS 21–24

Performance & Capstone

epoll, io_uring, zero-copy and an intro to DPDK; then a team capstone.

- epoll and io_uring
- Zero-copy I/O
- DPDK in one week
- Team capstone

You build: High-throughput protocol server to an enterprise brief

Your certificate

You earn it by doing two things:

- Attend every live session. If you miss one, make it up by watching the recording and submitting that week's lab within 7 days. You can do this up to 2 times per course.
- Score more than 50% on the final evaluation at the end of the course.

Your Enterprise Readiness Rating is separate: it scores your projects, capstone and assessments so employers can see how job-ready you are.

Questions

Email academy@originclouds.io, or see the course online: https://academy.originclouds.io/courses/network-protocol-developer