



إتقان تقنيات الراوتر المتقدمة: الشبكات والأمان وتحسين الأداء



AGILE LEADERS
Training Center

06 - 10 Dec 2026
كيب تاون

إتقان تقنيات الراوتر المتقدمة: الشبكات والأمان وتحسين الأداء

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Course Overview:

The course is an in-depth, hands-on program designed for IT professionals and network engineers looking to master advanced router configurations, optimize high-performance networking, and enhance network security. This course dives into cutting-edge technologies such as Linux kernel networking, multicast routing, and traffic engineering with eBPF, while also providing extensive training on policy-based routing PBR, advanced MPLS networking, and custom kernel module development. Participants will gain expertise in topics like secure VPN tunneling with WireGuard, IPsec implementation, and debugging techniques for Linux kernel networking. By the end of this course, attendees will be equipped with the tools and skills to design, implement, and troubleshoot complex network solutions. Whether you are exploring advanced kernel tunneling techniques or optimizing latency with eBPF, this course ensures you stay ahead in the rapidly evolving field of network engineering.

Target Audience:

- Network Engineers and Architects
- IT Infrastructure Specialists
- Cybersecurity Professionals
- System Administrators managing Linux-based networks
- Professionals transitioning to advanced roles in networking and security

Targeted Organizational Departments:

- IT and Networking Departments
- Cybersecurity Teams
- Cloud Infrastructure Teams
- Telecom and ISP Operations Teams

Targeted Industries:

- Telecommunications
- Cloud Computing and Data Centers
- Cybersecurity Firms
- Enterprise IT
- Financial Services

Course Offerings:

By the end of this course, participants will be able to:

- Design and implement Linux kernel networking solutions.
- Optimize high-performance networks for scalability.
- Configure and troubleshoot multicast routing with PIM-SM.
- Develop traffic engineering strategies using eBPF.
- Implement advanced policy-based routing PBR.
- Secure VPN tunnels with WireGuard and IPsec.
- Develop and debug custom kernel modules.

Training Methodology:

The training employs a blend of theoretical instruction, practical hands-on labs, case studies, and interactive group sessions. Participants will work on real-world scenarios, leveraging tools such as OpenSSL, Quagga/FRR, and bpftool. Interactive feedback sessions ensure participants grasp complex concepts and can apply them effectively.

Course Toolbox:

- ebooks and technical documentation
- Access to lab environments
- Tools like WireGuard, OpenSSL, and eBPF utilities
- Sample configurations and troubleshooting guides

Course Agenda:

Day 1: Kernel-Level Tunneling and Security

- Introduction to modern tunneling techniques for Layer 2 L2 and Layer 3 L3 VPNs **Topic 1:**
- GRE tunnel setup and WireGuard for secure tunneling **Topic 2:**
- Deep dive into encryption and secure tunneling kernel modules IPsec, WireGuard **Topic 3:**
- Developing and testing custom kernel-level tunneling protocols **Topic 4:**
- Debugging kernel tunneling code using ftrace and perf **Topic 5:**
- Performance insights with kernel debugging tools like dmesg and gdb **Topic 6:**
- Recap of tunneling techniques and secure implementations **Reflection & Review:**

Day 2: Multicast Routing and High-Performance Networking

- Linux kernel multicast implementation overview Topic 1: •
- Managing multicast groups with IGMP utilities and ip maddr Topic 2: •
- Optimizing multicast routing with PIM-SM and MSDP Topic 3: •
- Dynamic multicast group management with kernel modules Topic 4: •
- Implementing multicast flow control for traffic spikes Topic 5: •
- Validating QoS mechanisms in multicast networks Topic 6: •
- Discussion on multicast performance and optimizations Reflection & Review: •

Day 3: Segment Routing and Traffic Engineering with eBPF

- Introduction to Segment Routing over IPv6 SRv6 Topic 1: •
- Writing and deploying eBPF programs for traffic engineering Topic 2: •
- Real-time traffic monitoring and adjustments with eBPF tools Topic 3: •
- Building traffic engineering features within the Linux kernel Topic 4: •
- Optimizing latency-sensitive applications using custom queuing algorithms Topic 5: •
- Performance analysis using pktgen and perf Topic 6: •
- Reflect on eBPF applications and segment routing Reflection & Review: •

Day 4: Policy-Based Routing and Advanced Network Security

- Implementing policy-based routing PBR in the Linux kernel Topic 1: •
- Advanced traffic filtering with custom Netfilter hooks Topic 2: •
- Enforcing traffic policies with stateful filtering conntrack Topic 3: •
- TCP congestion control for high-traffic scenarios Topic 4: •
- Monitoring security events with a user-space interface Topic 5: •
- Centralized monitoring with the ELK Stack Topic 6: •
- Review of advanced PBR and network security techniques Reflection & Review: •

Day 5: Advanced MPLS and Performance Optimization

- Exploring advanced MPLS features in Linux-based routers Topic 1: •
- Managing MPLS labels and traffic flows with kernel modules Topic 2: •
- Virtual Private Routed Networks VPRN implementation in the kernel Topic 3: •
- Debugging and profiling kernel networking code for performance Topic 4: •
- High-performance packet forwarding with DPDK Topic 5: •
- Building scalable data plane applications with SmartNICs and SR-IOV Topic 6: •
- Recap on MPLS advancements and performance optimization Reflection & Review: •

How This Course is Different from Other Advanced Router Training Courses:

- Unlike generic router training programs, the course focuses on hands-on, Linux-based implementations and cutting edge technologies like eBPF, WireGuard, and advanced MPLS networking. This course uniquely combines
- theoretical knowledge with practical applications, enabling participants to work on real-world scenarios using state of-the-art tools and methodologies. The integration of advanced debugging techniques and performance optimization strategies ensures participants are well-equipped to tackle complex networking challenges, making this course a standout in the field.



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DEVELOPMENT

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مدن التدريب



أوسلندا - هولندا



أكرا - غانا



أثينا - اليونان



أبوظبي - الإمارات العربية المتحدة



الدوحة - قطر



الدار البيضاء - المغرب



الجبيل - المملكة العربية السعودية



اسطنبول - تركيا



المنامة - مملكة البحرين



الكويت - الكويت



القاهرة - مصر



الرياض - المملكة العربية السعودية



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باكو - أذربيجان



باريس - فرنسا

مدن التدريب



بورنو - البرتغال



برلين - ألمانيا



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تورنتو - كندا



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جنيف - سويسرا



سيول - كوريا الجنوبية



سنغافورة - سنغافورة



سان دييغو - الولايات المتحدة الأمريكية



زنجان - تنزانيا

مدن التدريب



طشقند - أوزبكستان



طرابزون - تركيا



شيكاغو - الولايات المتحدة
الأمريكية



شرم الشيخ - مصر



فرانكفورت - ألمانيا



عن بعد - منصة زووم



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لانكاوي - ماليزيا



كيب تاون - جنوب إفريقيا



كوالالمبور - ماليزيا



فريبورغ - النمسا



مدريد - إسبانيا



ماربيا - إسبانيا



لندن - المملكة المتحدة



لشبونة - البرتغال

مدن التدريب



فيونخ - ألمانيا



ميلان - إيطاليا



مونتره - سويسرا



مسقط - سلطنة عمان



نيس - فرنسا



نairobi - كينيا

WHO WE ARE

Agile Leaders is a renowned training center with a team of experienced experts in vocational training and development. With 20 years of industry experience, we are committed to helping executives and managers replace traditional practices with more effective and agile approaches.

OUR VISION

We aspire to be the top choice training provider for organizations seeking to embrace agile business practices. As we progress towards our vision, our focus becomes increasingly customer-centric and agile.

OUR MISSION

We are dedicated to developing value-adding, customer-centric agile training courses that deliver a clear return on investment. Guided by our core agile values, we ensure our training is actionable and impactful.

WHAT DO WE OFFER

At Agile Leaders, we offer agile, bite-sized training courses that provide a real-life return on investment. Our courses focus on enhancing knowledge, improving skills, and changing attitudes. We achieve this through engaging and interactive training techniques, including Q&As, live discussions, games, and puzzles.



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