

InfraThrone Elite – Prerequisite Week

Section 1 – Linux & OS Internals

Why: 90% of production outages you'll handle have a Linux component, permissions, processes, networking, or kernel. You *must* be fluent.

Key Topics to Master:

- **Boot Process:** BIOS → Bootloader → Kernel → init/systemd → Target runlevel
- **Systemd Deep Dive:** systemctl, service dependencies, overrides, journal logs
- **Filesystem Internals:** ext4 vs xfs, inode usage, mount options, tuning with tune2fs
- **Process Management:** ps, top, htop, pidstat, cgroups, priority tuning (nice, renice)
- **Memory Debugging:** free, vmstat, OOM killer analysis
- **Disk & IO Debugging:** iostat, iotop, df, du, smartctl health checks

Hands-On Prereq Tasks:

1. Spin up a VM and break/recover the boot process (GRUB misconfig, missing initramfs).
2. Simulate OOM killer by stress-testing memory.
3. Fill / and recover without reboot.

Section 2 – Networking Fundamentals

Why: If your app is slow, 50% of the time it's networking. You *must* debug from Layer 1–7.

Key Topics to Master:

- **DNS Stack:** /etc/resolv.conf, dig, nslookup, caching layers
- **Routing & ARP:** ip route, ip neigh, route priorities, ECMP basics
- **Packet Flow Debugging:** tcpdump, ss, netstat, conntrack
- **Firewall Mastery:** iptables, nftables, DROP vs REJECT, stateful filtering
- **Latency & MTU Issues:** ping, traceroute, mtr, PMTU discovery

Hands-On Prereq Tasks:

1. Debug a “DNS works locally but fails in the container” issue.
2. Simulate packet drops using tc netem.
3. Block and selectively allow traffic with iptables rules.

Section 3 – Git & Version Control Mastery

Why: IaC, CI/CD, and platform configs live in Git. Mess it up, you break prod.

Key Topics:

- Git branching strategies (main, develop, hotfix flows)
- Commit hygiene, signed commits, GPG verification
- Advanced diffs & blame usage
- GitOps workflow basics for infra repos

Hands-On Prereq Tasks:

1. Recover a branch after a bad force push.
2. Resolve complex multi-branch merge conflicts.
3. Implement pre-commit hooks for Terraform linting.

Section 4 – Terraform & IaC Basics

Why: Elite-level infra work starts with automation, not console clicks.

Key Topics:

- Providers, resources, variables, outputs
- State mgmt (local, remote, locking)
- terraform plan vs apply vs import
- Drift detection and state refresh

Hands-On Prereq Tasks:

1. Create a basic VPC with public/private subnets.
2. Move from local to remote state in S3/GCS.
3. Import existing infra into Terraform without downtime.

Section 5 – Containers & Orchestration Primer

Why: All elite scenarios assume you can debug at the container, pod, and cluster level without docs.

Key Topics:

- Docker build caching & multi-stage builds
- Networking modes (bridge, host, none)
- Container debugging with nsenter
- Kubernetes basics: pods, services, configmaps, secrets, RBAC fundamentals

Hands-On Prereq Tasks:

1. Build an image with the smallest possible size.
2. Attach to a running container's network namespace and debug.
3. Deploy an app to Kubernetes without Helm/Kustomize.

Section 6 – Observability Basics

Why: Without metrics/logs/traces, you're blind in production.

Key Topics:

- Prometheus scrape configs & queries (PromQL basics)
- Grafana dashboard variables & templating
- Loki log queries with filters and regex
- OpenTelemetry agent setup

Hands-On Prereq Tasks:

1. Set up a minimal Prometheus + Grafana stack.
2. Build a dashboard for CPU, memory, and pod restarts.
3. Query logs for specific error patterns over last 1h.

Section 7 – Security & Secrets Hygiene

Why: 70% of real-world elite war rooms come from security gaps.

Key Topics:

- SSH key rotation, cert-based auth
- Secrets mgmt with SealedSecrets/HashiCorp Vault
- SAST & secret scanning in repos
- Basic threat modeling for cloud-native workloads

Hands-On Prereq Tasks:

1. Rotate SSH keys for all cluster nodes.
2. Scan a repo with Trivy and fix vulnerabilities.
3. Deploy a sealed secret and consume it in a pod.

Final Check Before Week 1

1. Can debug Linux boot & networking issues without Googling
 2. Can recover from a bad Terraform state
 3. Can deploy and debug a pod without Helm
 4. Can read Prometheus metrics and link them to logs
 5. Can secure secrets & rotate keys without downtime
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