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TELECOM INITIATIVE

Certification (Beta)

Certification Demo and Basic Usage of CNTi Test Catalog

tietoevry
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https://lfnetworking.org

Presenter: Martin Matyas

- Lead cloud engineer in tietoevry
- Has been helping vendors to develop software-based telecom infrastructure for 20+ years
  - IMS, Openstack, VNF/CNF platforms
- Cloud-native applications
- CNTi active contributor since beginning of 2024

Cloud Native Telecom Initiative

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Best Practices

- Documents cloud native and Kubernetes-native **best practices for networking**.
- Recommends **vendor-neutral**, foundational best practices.
- Collaborates with LF Networking projects.

Test Catalog

- Develops functional, non-functional, and end-to-end **tests based on best practices**.
- Creates a **robust testing framework** and infrastructure.
- Provides **remediation** on failed tests **to help application developers**.

Certification

- Built on the foundation of CNCF's CNF Certification program.
- Extended to address the needs of **modern Cloud Native Network Functions**.
- Self-executable and **community-reviewed**.

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CNTi Certification (WIP)

- **Aspirational Linux Foundation Networking** program for **certifying** Cloud Native Network Functions (**CNFs**)
- Provides confidence to Communication Service Providers (CSPs) and Application Vendors that their **applications follow best practices**
- Uses **self-certification** approach using CNTi testsuite
- Runs on **any** Certified **Kubernetes** test environment
- **Beta Certification free for** any interested party

CNTI Test Catalog





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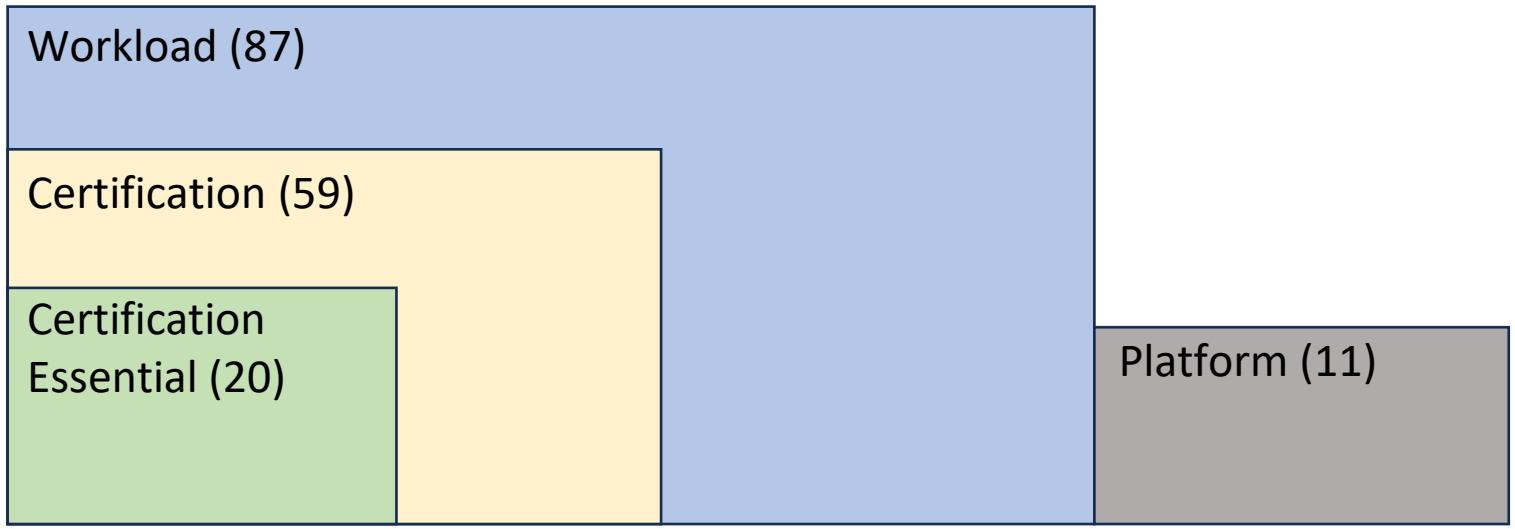
- **Test suite** used for CNTi Beta Certification
- **Collection of** generic and telecom-oriented cloud-native **test cases**
- **Validates telecom application's adherence** to cloud native principles and best practices



CNTi Test catalog categories

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🏷️ Configuration

Is CNF configuration done in a standard declarative way?
Ex:
Helm Chart hardcoding
Image tagging
Secrets

⚖️👀 Microservices

Does the CNF follow microservice principles?
Ex:
Single process type
Signal/zombie handling
Startup time

🫧 State

Does the CNF follow storage principles?
Ex:
Volumes
Database
Node drain

🔓 Security

Is the CNF secure enough?
Ex:
Privileges
Mounts
SELinux

🌐 Compatibility, Installability & Upgradability

Will the CNF work in standard environment and with other products?
Ex:
Scaling
Upgrade/rollback
Helm chart valid

📶 Observability & Diagnostics

Is the CNF observable in a standard way?
Ex:
Logs
Tracing
Metrics

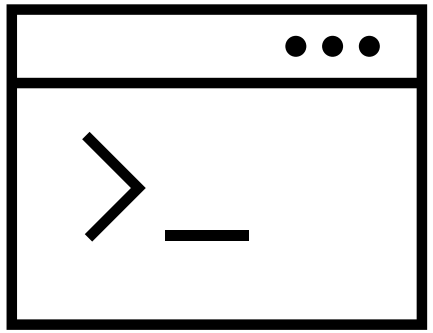
🪡 Reliability, Resilience & Availability

Does the CNF behave correctly in stressed environment?
Ex:
Network params
Probes
Memory/disk behavior

📞 5G tests

Does the CNF follow 5G best practices?
Ex:
SUCI
SMF/UPF heartbeat
ORAN E2

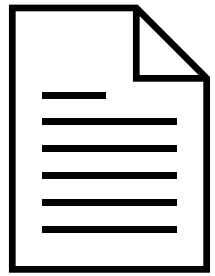
Demo 1: CNTI Test Catalog



Certification steps (Beta)

1. **Meet eligibility criteria**
   - Terms & Conditions
   - Participation form
   - Technical requirements
2. **Run certification tests**
   - Follow test execution instructions
   - Check results. If not fulfilling criteria -> adapt CNF and repeat
3. **Submit results**
   - Create a pull request to certification repo
4. **Promote**
   - Landing page and landscape
   - Certified LFN CNTi mark

Certification instructions



[Instructions]

Certification Criteria

CNTi Certification 2.0 Beta

- 59 tests total across categories
- 20 tests considered as “essential”
- At least **15 of 20 “essential” tests must pass** to comply

Certification-2.0-Beta Tests

Security (7)

- **privileged_containers**
  - containers should not run in privileged mode unless needed
- **non_root_containers**
  - container services should not run root user/group
- **cpu_limits**
  - containers should have CPU limits defined
- **memory_limits**
  - containers should have memory limits defined
- **hostpath_mounts**
  - volume host path configurations should not be used
- **container_sock_mounts**
  - container runtime sockets should not be mounted as volumes
- **selinux_options**
  - containers should use SELinux and should not have any 'seLinuxOptions' configured that allow privilege escalation

Certification-2.0-Beta Tests

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⚖️👀 Microservice (4)

- **single_process_type**
  - container has one process type
- **sig_term_handled**
  - sigterm is handled by PID 1 process of containers
- **zombie_handled**
  - zombie processes are handled/reaped by PID 1 process of containers
- **specialized_init_system**
  - container images should use specialized init systems for containers

🌐 Compatibility (1)

- **increase_decrease_capacity**
  - Horizontal Pod Autoscaling (HPA) up and down should work with pods

Certification-2.0-Beta Tests

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State (2)

- **volume_hostpath_not_found**
  - volume host path configurations should not be used
- **node_drain**
  - all workload resources are successfully rescheduled onto other available node(s)

Configuration (3)

- **hostport_not_used**
  - the hostPort configuration field is not found in any of the defined containers so they are not bind to a node
- **hardcoded_ip_addresses_in_k8s_runtime_configuration**
  - no hardcoded IP addresses or subnet masks are found in the Kubernetes workload resources
- **latest_tag**
  - The CNF should use an immutable tag that maps to a semantic version of the application

Certification-2.0-Beta Tests

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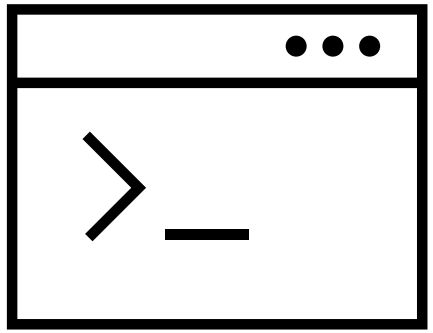
🗡️ Resilience (2)

- **liveness**
  - liveness probe configured for pods
- **readiness**
  - readiness probe configured for pods

📶 Observability (1)

- **log_output**
  - output logs should be sent to STDOUT/STDERR

Demo 2: Certification (Beta)



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Questions and maybe answers