

IETF #104 - BMWG Methodology for VNF Benchmarking Automation

R. Rosa, C. Rothenberg, **M. Peuster**, H. Karl

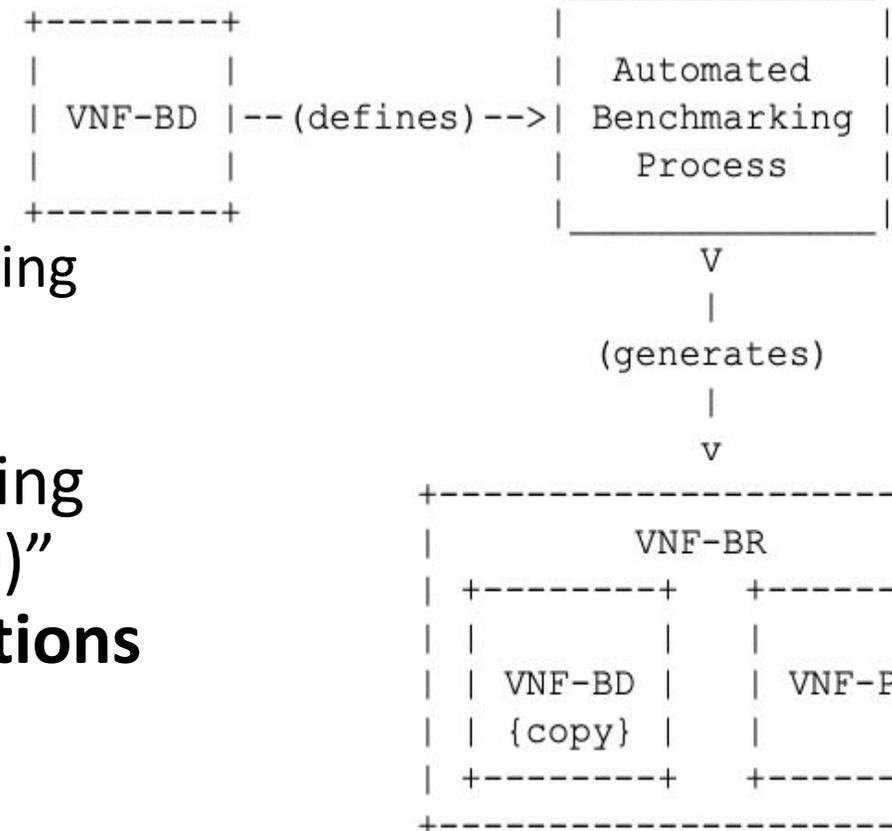
Why ...

“If VNFs deployments can be fully automated, VNF benchmarking should be automated as well!”

Concept: Design and specify a **generic workflow to automatically execute arbitrary pre-defined VNF benchmarking experiments.**

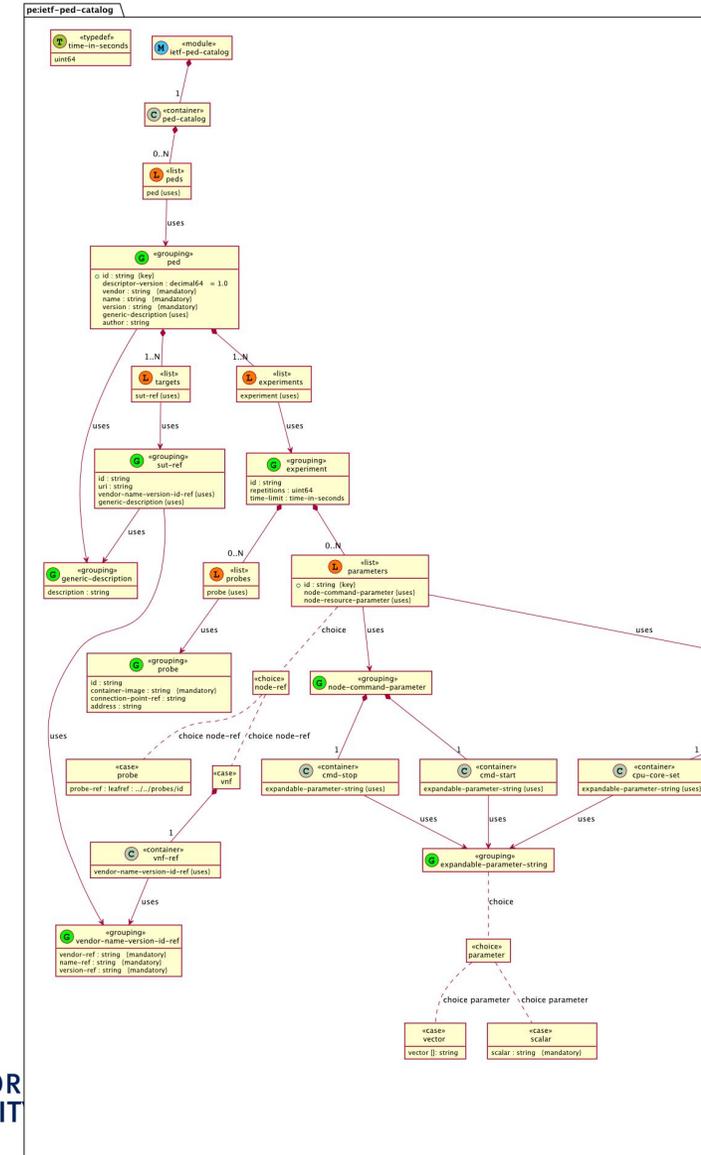
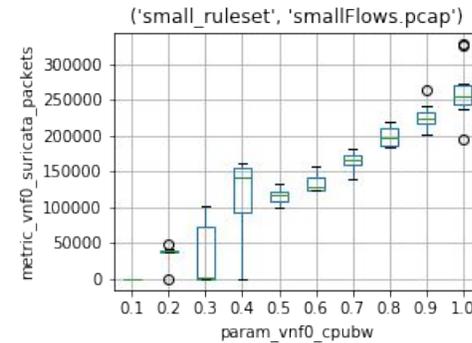
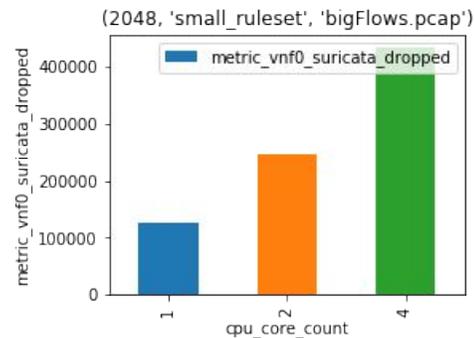
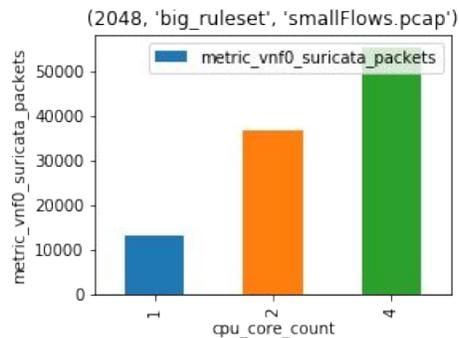
The draft and its recent update

- Re-structured draft -03
- **End-to-end** definition of **automated VNF benchmarking** method
 - We define **how to automate** the benchmarking process, **not how to benchmark** → highly depends on the SUT
- Benchmarking experiment description using “**VNF benchmarking descriptors (VNF-BD)**”
- **Two** open-source **reference implementations**
 - Gym [1][2]
 - 5GTANGO benchmarker “tng-bench” [3][4]



Work in progress and future plans

- **YANG-based data models** [5] for VNF-BDs, VNF-PPs, etc.
- **YANG-based interface definitions** for probes, monitors, etc.
- Run **experiments** and produce **example results** [6] using the two reference implementations



Open issues and further discussion

- **Generic representation** for VNF performance **profiles** (VNF-PPs)?
 - **MUST: Machine readable** to be **used by orchestration** solutions etc.
 - Suggestions?
- **Alignment / collaboration** with other drafts of the BMWG
 - RFC8172: Considerations for Benchmarking Virtual Network Functions and Their Infrastructure (done, see Sec. 6.4)
 - Considerations for Benchmarking Network Performance in Containerized Infrastructures
 - Considerations for Benchmarking Network Virtualization Platforms
 - A YANG Data Model for Network Interconnect Tester Management
 - RFC 8204: Benchmarking Virtual Switches in the Open Platform for NFV (OPNFV)
 - ... others?

Thank you!

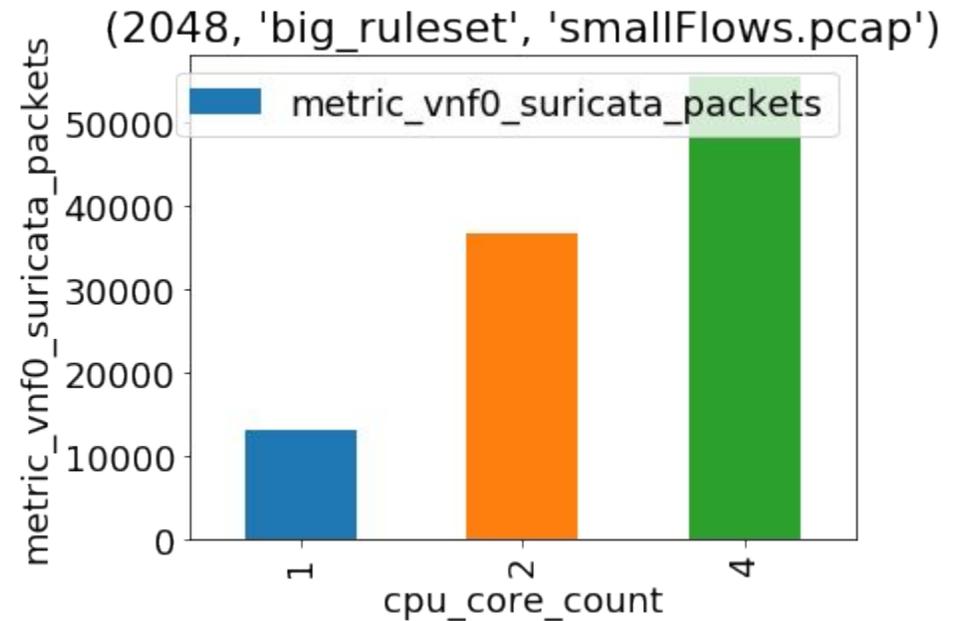
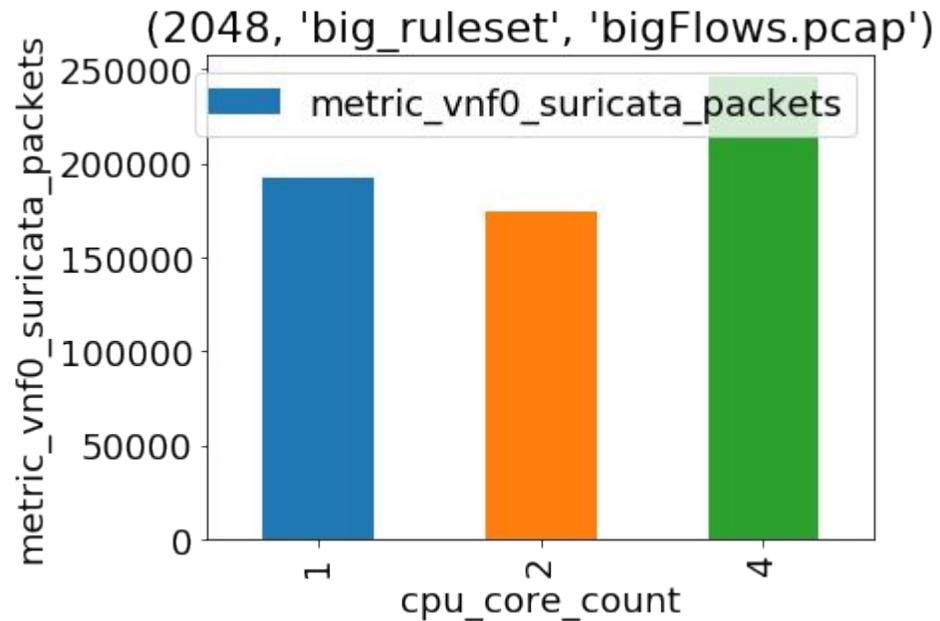
References

- [1] R. Rosa, C. Bertoldo, C. Rothenberg, "Take your VNF to the Gym: A Testing Framework for Automated NFV Performance Benchmarking", IEEE Communications Magazine Testing Series , Sept 2017, <<http://ieeexplore.ieee.org/document/8030496>>.
- [2] "Gym Home Page", <<https://github.com/intrig-unicamp/gym>>.
- [3] M. Peuster, H. Karl, "Profile Your Chains, Not Functions: Automated Network Service Profiling in DevOps Environments", IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN) , 2017, <<http://ieeexplore.ieee.org/document/8169826/>>.
- [4] "5GTANGO VNF/NS Benchmarking Framework", <<https://github.com/sonata-nfv/tng-sdk-benchmark>>.
- [5] YANG Models: <https://github.com/raphaelvrosa/vnf-bench-model/tree/master/vnf-br/yang>
- [6] Example Results: <https://github.com/raphaelvrosa/vnf-bench-model/tree/master/experiments>

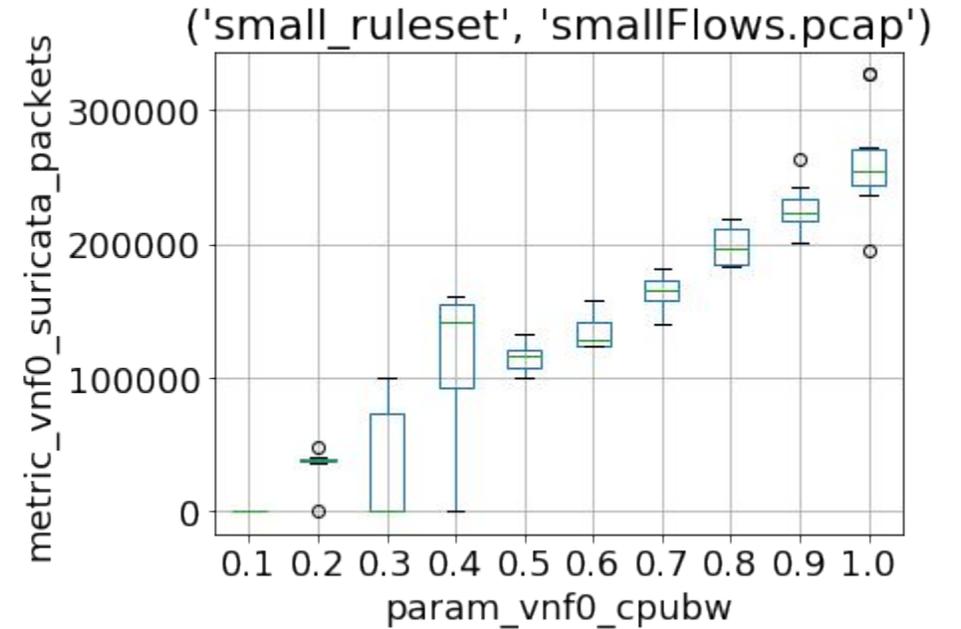
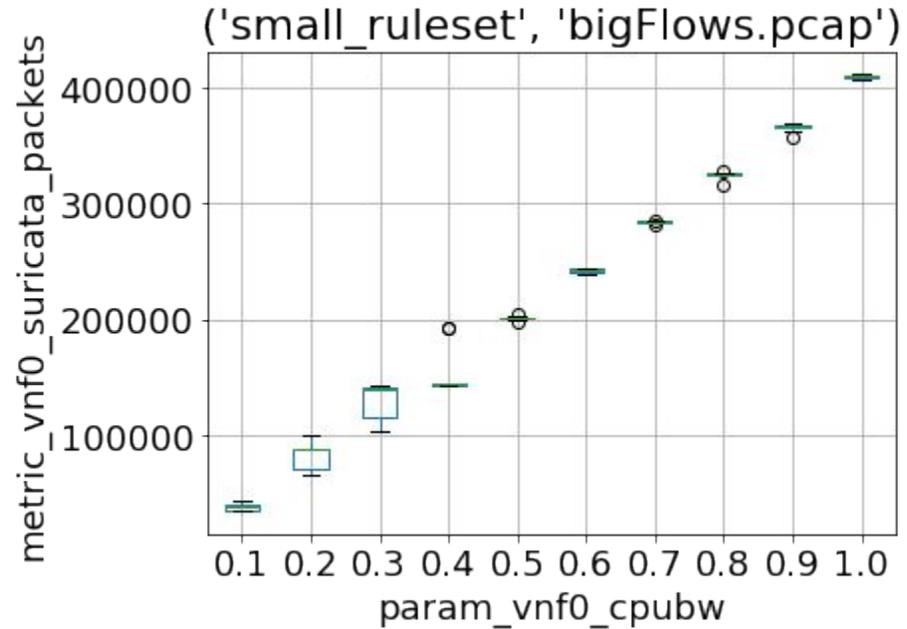
Backups: Example Results

- SUT: Suricata IDS VNF deployed in a Docker container
- Parameters
 - Different IDS rulesets
 - Different number of vCPU cores
 - Different amounts of CPU bandwidth (CPU time)
 - Different memory limits
- Stimulation
 - Traffic traces with small and big flows
- Experiments executed without human interaction using benchmarking descriptors
- Everything open:
<https://github.com/raphaelvrosa/vnf-bench-model>

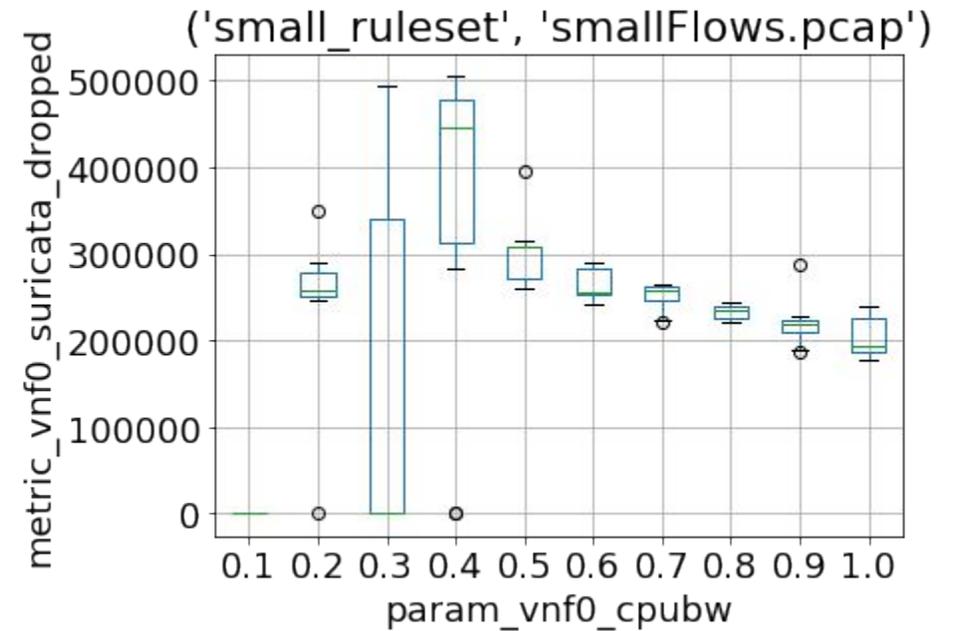
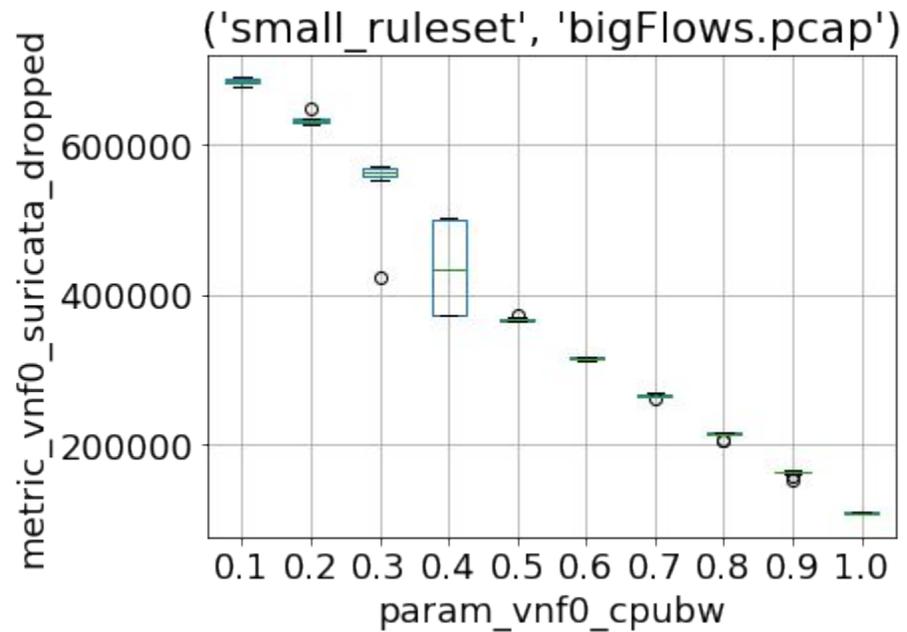
Proc. Packets vs. CPU cores and flow sizes



Proc. Packets vs. CPU time



Dropped Packets vs. CPU time



Backups: Figures etc.

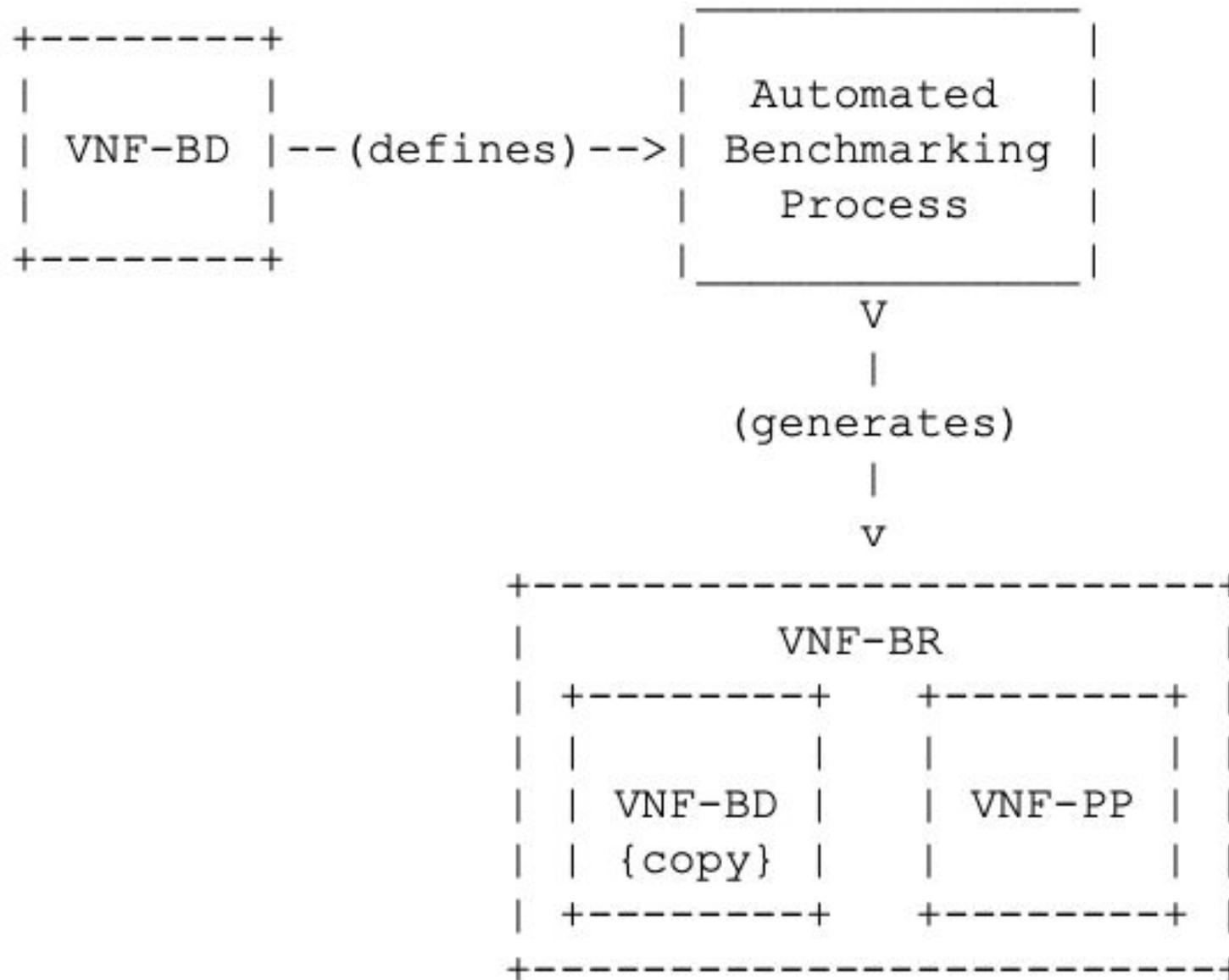


Figure 2: VNF benchmarking process inputs and outputs