

# An Introduction to CNI

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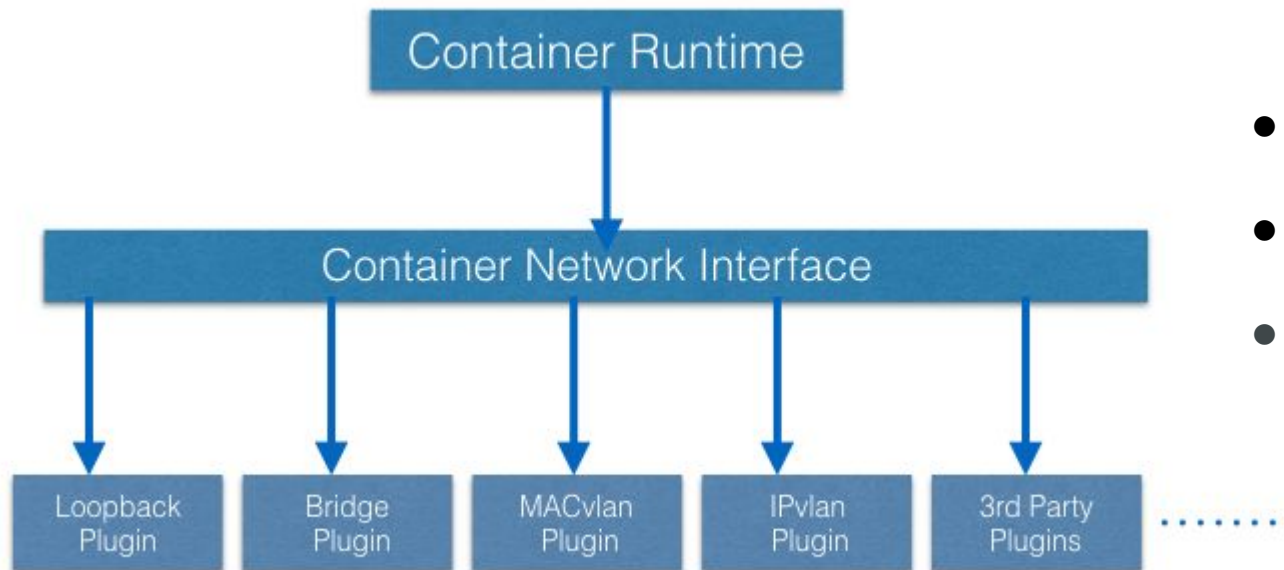
# What's on the agenda?

- What is CNI?
- How CNI is called by a container runtime
- How to configure CNI
- How to develop your own plugin from scratch
- CNI Tool



# What is CNI?

# CNI - What's that?



- Serve as a bridge between the plugins and the containers.
- Works at the *Container Runtime* level (CRI-O, RKT) k8s is not aware of it.
- Container runtimes uses CNI operations (*ADD, DEL, CHECK, VERSION*) to include or remove containers from the interface

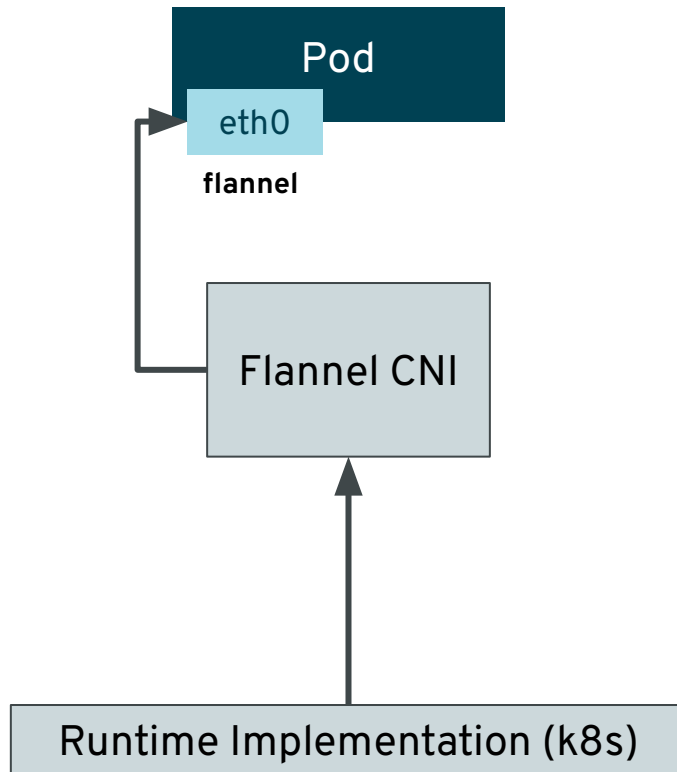
# CNI Operations, "Commands"

ADD	_____	<i>Add container to network, or apply modifications</i>
DEL	_____	<i>Remove container from network, or un-apply modifications</i> Do garbage collection!
CHECK	_____	<i>Check container's networking is as expected</i> Generally called right after pod creation succeeds. Exit non-zero if check doesn't succeed.
VERSION	_____	<i>probe plugin version support</i> Check the spec for the exact format.

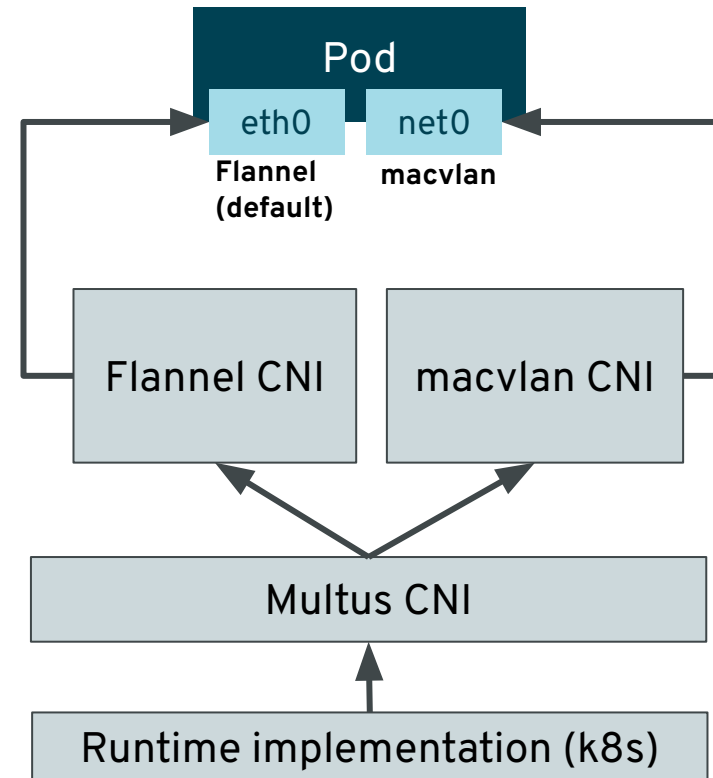


# Multus - Multiplexing CNI ADD

Pod without Multus



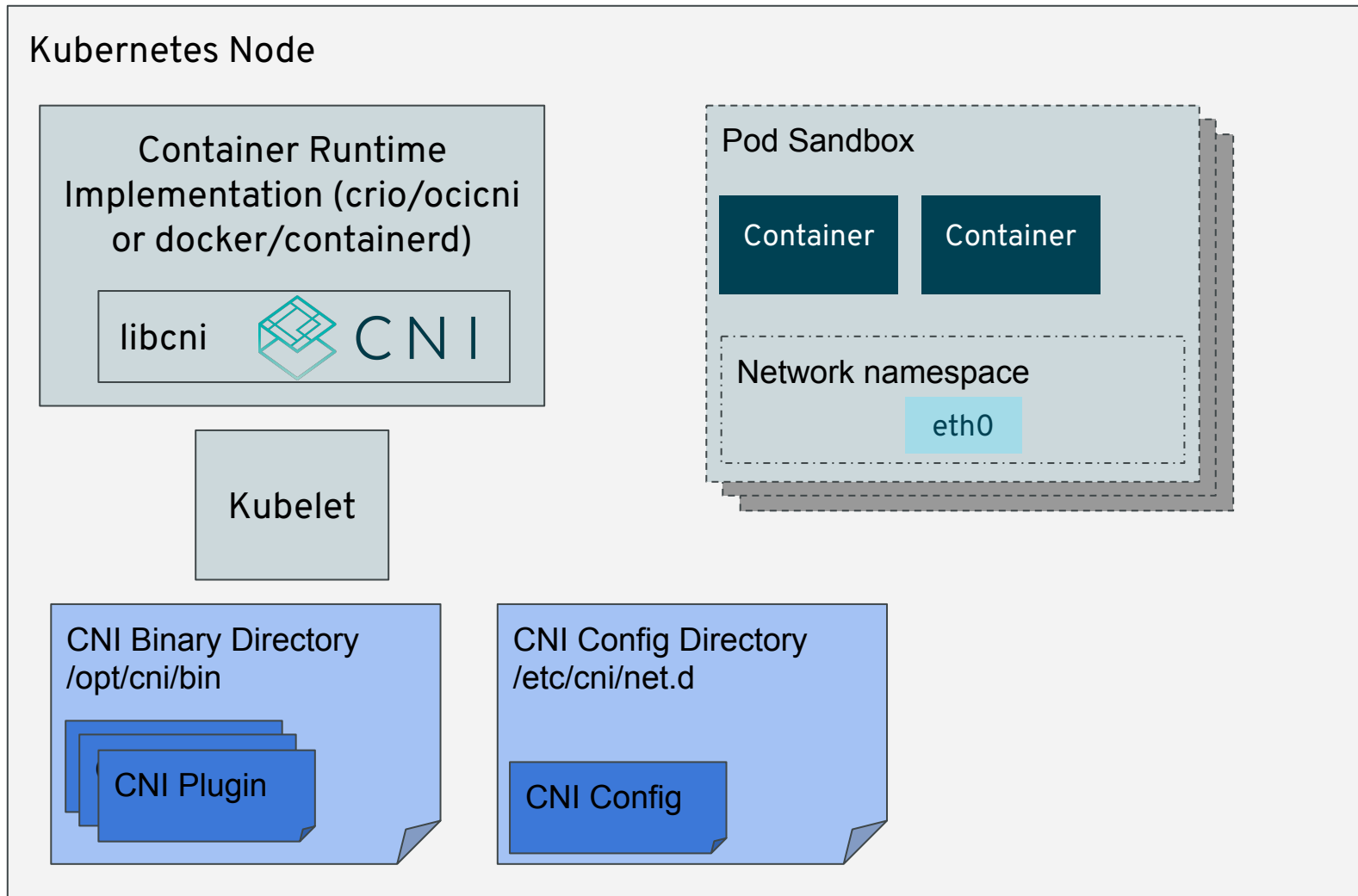
Pod with Multus



# How CNI is called by Container Runtime

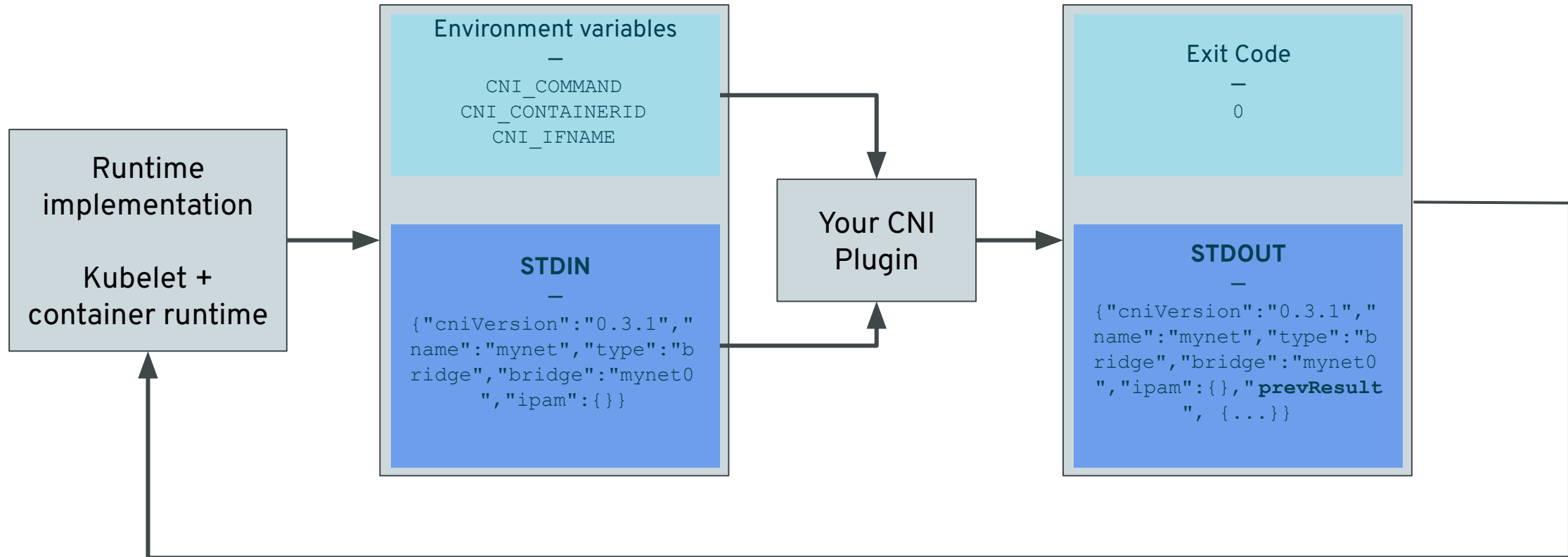


# How CNI is called by a container runtime



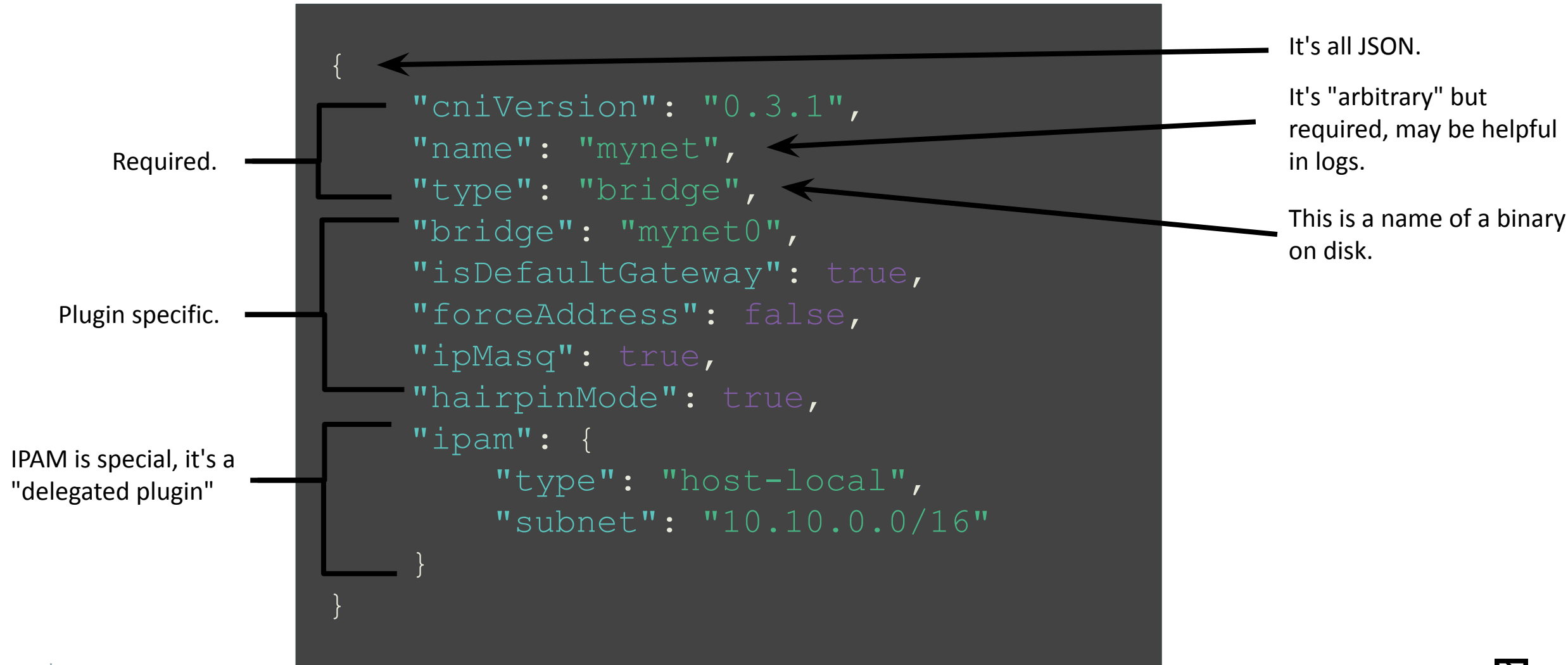
# What goes into a CNI plugin call?

CNI plugins are executed on the host, and get input from STDIN, as well as environment variables, and they give output as STDOUT (and an exit code)

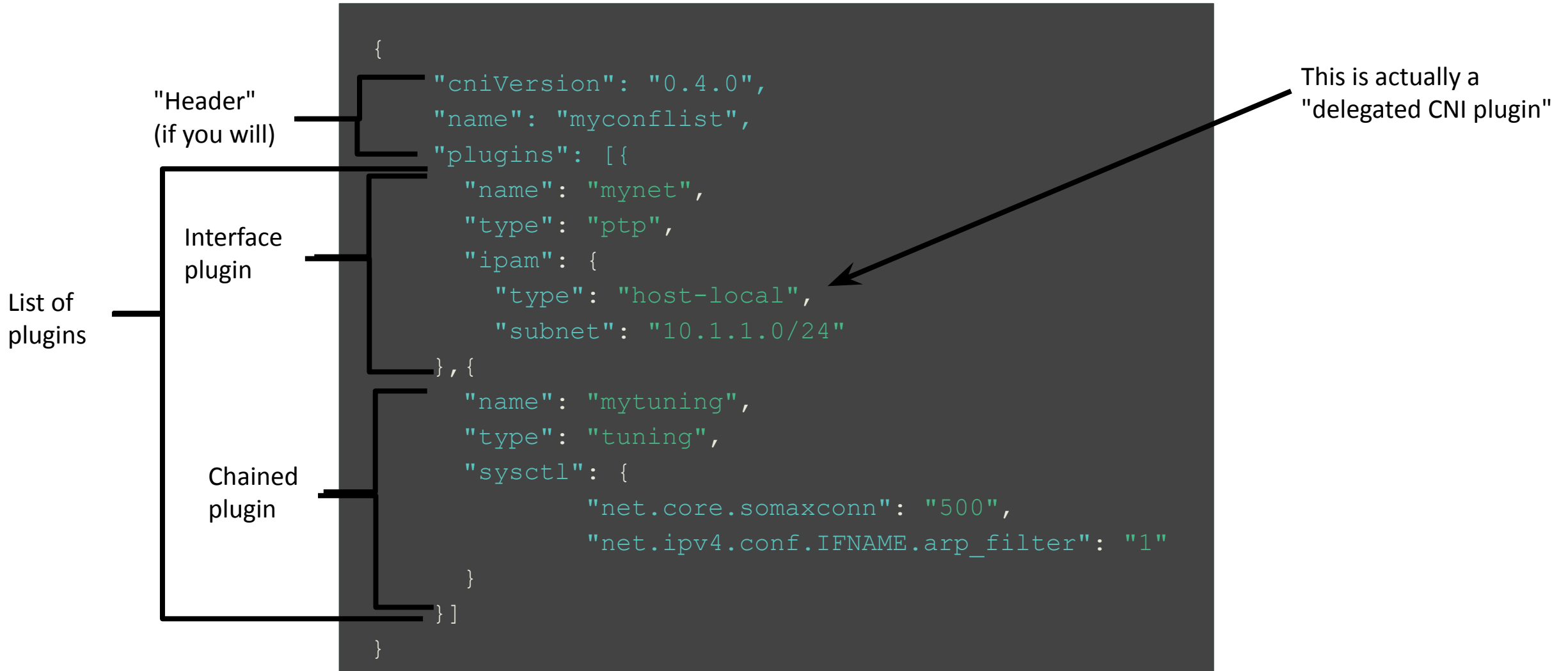


# How configure CNI?

# CNI Configuration Anatomy



# CNI Configuration: Chained plugins (or a "conflist")



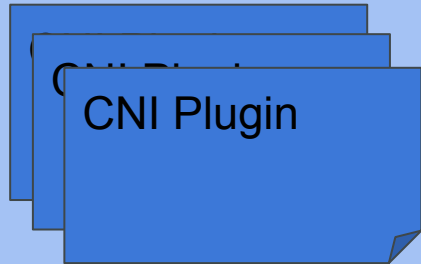
# How to develop your own plugin from scratch

# Wait, where did I put that? Know your paths

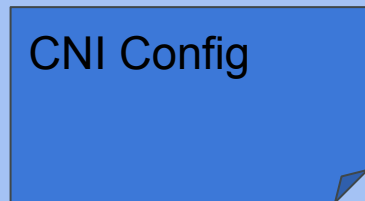
Figure out where your paths are, these are key!

```
$ ps ax | grep kubelet  
$ cat /var/lib/kubelet/config.yaml
```

CNI Binary Directory  
/opt/cni/bin  
"The bin dir"



CNI Config Directory  
/etc/cni/net.d  
"The conf dir"



## Quick Tips!

- JSON linters are your friend! Especially jq
- Logging: Add it if you're a developer (users will thank you!)
- Use static pods for debugging (they'll be on the same host!)

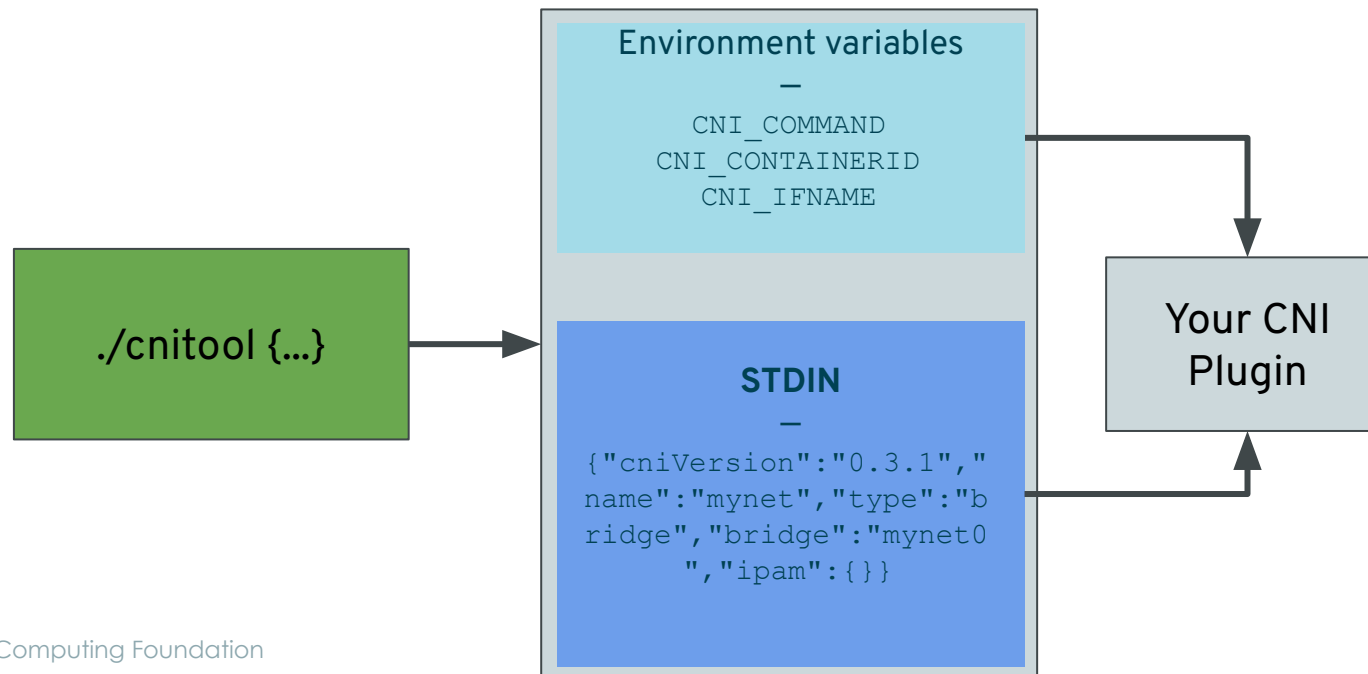




# CNI Tooling

# CNI Tool: Your CNI swiss army knife

- Full tutorial / DIY workshop @ [cnitoool -- your CNI Swiss Army knife · doughbiv](https://doughbiv.com/cnitoool-your-cni-swiss-army-knife/)
- It allows you to execute your plugins without having to launch a pod, cnitoool calls your binary with the ENV variables and CNI configs.



Thank you!