



**Linaro
connect**
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Genpd news/next

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Agenda

- Multiple PM domains per device (done)
- Performance states in genpd (initial support)
- Genpd + opp == DVFS (evolving)

Callers of pm_genpd_init():

v4.14: 24

v4.20-rc1: 28



BTW: Fixup PM domain attach

```
ret = dev_pm_domain_attach(dev, true);
```

v4.17:

```
if (ret != -EPROBE_DEFER)  
    ret = drv->probe(dev);
```

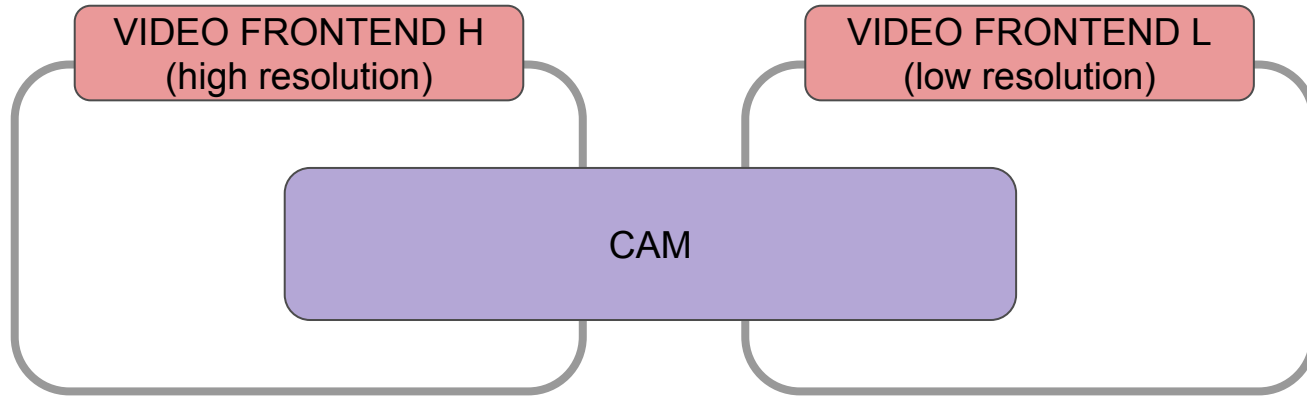
v4.18:

```
if (ret)  
    return ret;  
ret = drv->probe(dev);
```

***From v4.18 we can deal
with error codes, yeah! :-)***



QCOM APQ8096 - Cam.subsystem



Implementation

Constraints

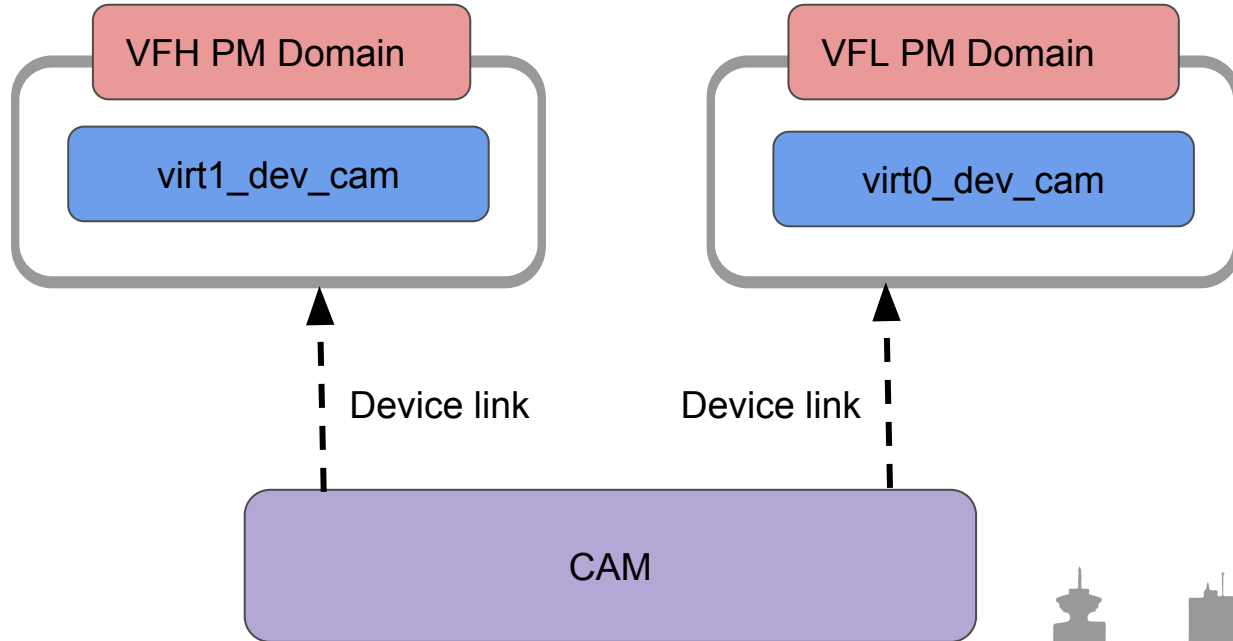
- Consumer control PM domains independently.
- Device PM (runtime/system) work seamlessly.
- Legacy for single PM domain.

Solution

- Attach one virtual device per PM domain.
- Consumer use device links to control PM.



QCOM APQ8096 - Cam.subsystem



DT - Multiple PM domains

```
vfpd: power-controller@12340000 {  
    compatible = "vfpd,power-controller";  
    reg = <0x12340000 0x1000>;  
    #power-domain-cells = <1>;  
};  
  
cam-device@12351000 {  
    compatible = "foo,cam";  
    reg = <0x12351000 0x1000>;  
    power-domains = <&vfpd 0>, <&vfpd 1> ;  
    power-domain-names = "low", "high";  
};
```



1: Attach and probe

Attach

```
dev_vf_low = dev_pm_domain_attach_by_name(dev, "low");  
dev_vf_high = dev_pm_domain_attach_by_name(dev, "high");
```

Note: No power on for “multi attach”!

Probe

```
link_vf_low = device_link_add(dev, dev_vf_low,  
                               DL_FLAG_STATELESS | DL_FLAG_PM_RUNTIME |  
                               DL_FLAG_RPM_ACTIVE);  <- You may skip this flag.
```



2: Adopt to the use case

Low resolution

```
link_vf_low = device_link_add(dev, dev_vf_low,  
                               DL_FLAG_STATELESS | DL_FLAG_PM_RUNTIME |  
                               DL_FLAG_RPM_ACTIVE);
```

High resolution

```
link_vf_high = device_link_add(dev, dev_vf_high,  
                                DL_FLAG_STATELESS | DL_FLAG_PM_RUNTIME |  
                                DL_FLAG_RPM_ACTIVE);
```

High -> Low

```
device_link_del(link_vf_high);
```

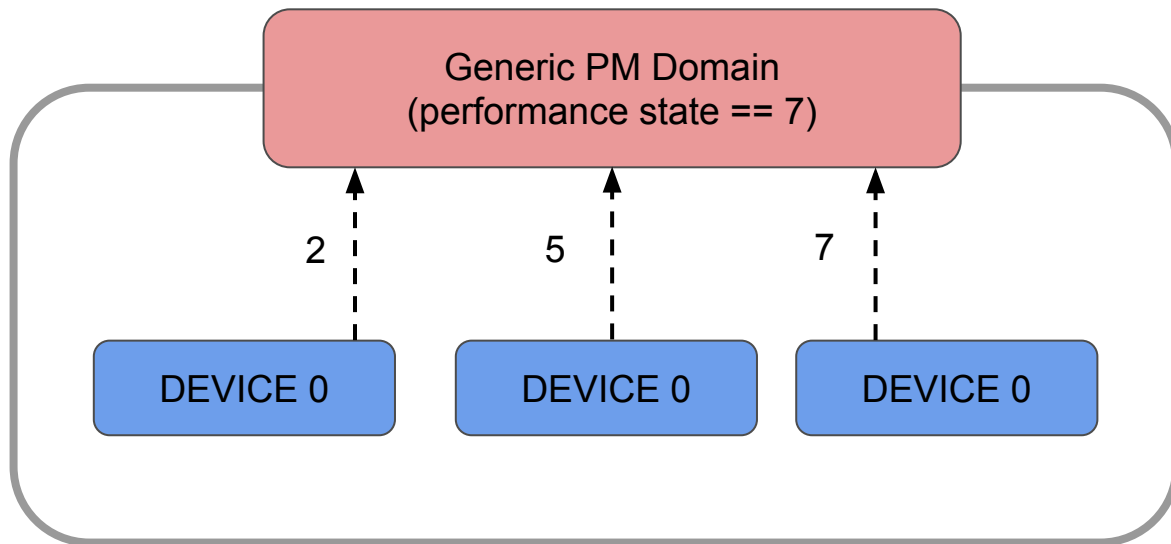


Examples

- `drivers/media/platform/qcom/camss/camss-csid.c (v4.19)`
- `drivers/usb/host/xhci-tegra.c (v4.20-rc1)`



Genpd performance states



Provider/consumer interface

Genpd provider:

->set_performance_state(genpd, state)

Ongoing: Propagate performance state to masters

Consumer:

dev_pm_genpd_set_performance_state(dev, state)

What performance state?



1: Genpd + opp == DVFS

Genpd provider:

->opp_to_performance_state(genpd, opp)

Genpd:

dev_pm_opp_of_add_table(dev)

dev_pm_opp_of_add_table_indexed(dev, idx)



2: Genpd + opp == DVFS

OPP core:

of_genpd_opp_to_performance_state(dev, np) (removed)

pm_genpd_opp_to_performance_state(genpd, opp) (next)

dev_pm_genpd_set_performance_state(dev, state)

Consumers drivers:

dev_pm_opp_set_rate(dev, rate)

dev_pm_opp_set_virt_dev(dev, virt_dev, idx) (next)

