Add Node into Graph

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How To VPP16.09

Override
- (insert?) on init, e.g. vcgn-classify
- dpdk_set_next_node()

Redirect
- on runtime, e.g. sample-node
- vnet_hw_interface_rx_redirect_to_node()

RX feature path
- partial order, e.g. ip4/6 features
- ip_feature_init_cast()
  - vnet_config_init()

Add on runtime
- enable via CLI only?
- vlib_node_add_next_with_slot()
- vlib_node_add_next()

Update Graph

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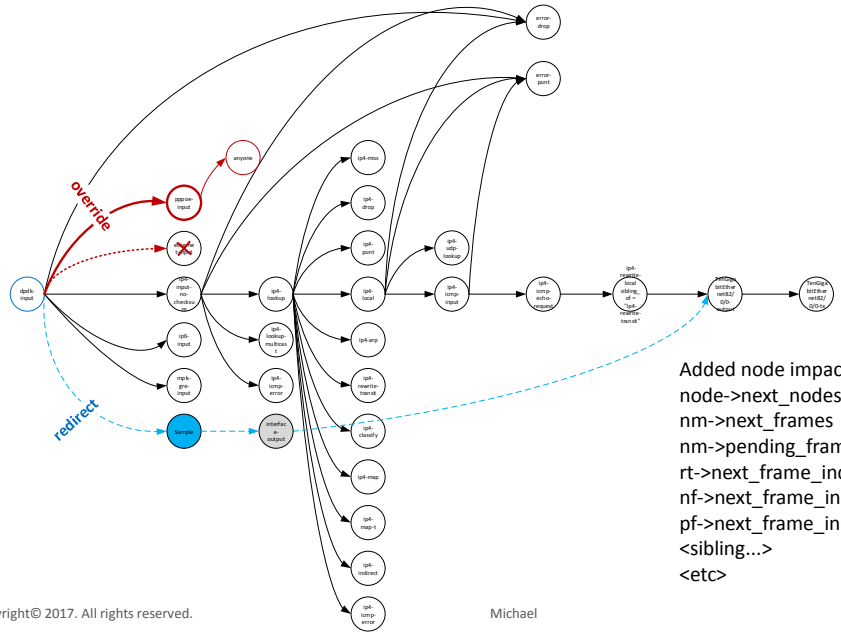

Added node impacting to:
node->next_nodes
nm->next_frames
nm->pending_frames
rt->next_frame_index
nf->next_frame_index
pf->next_frame_index
<sibling...>
<etc>

Flowchart

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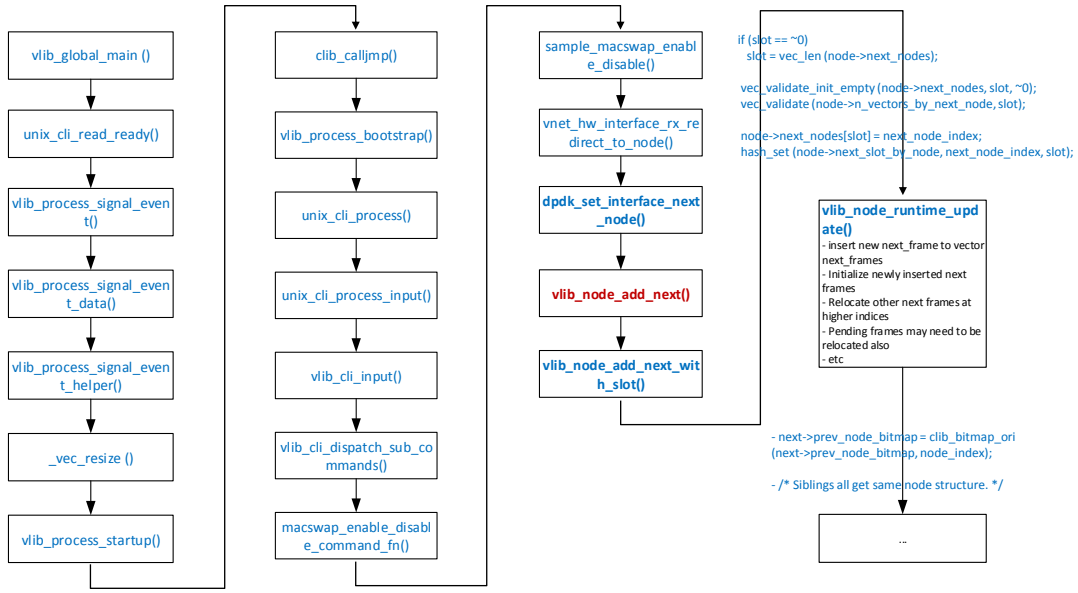

Trace(redirect)

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```
00:00:57:676807: dpdk-input
  TenGigabitEthernet82/0/0 rx queue 0
  buffer 0x48d5: current data 0, length 60, free-list 0, totlen-nifb 0, trace 0x3
  PKT MBUF: port 0, nb_segs 1, pkt_len 60
    buf_len 2176, data_len 60, ol_flags 0x0, data_off 128, phys_addr 0x7afdc680
    packet_type 0x0
  ARP: 90:e2:ba:84:1c:3a -> ff:ff:ff:ff:ff:ff
  request, type ethernet/IP4, address size 6/4
  90:e2:ba:84:1c:3a/100.1.0.2 -> 00:00:00:00:00:00/100.1.0.1
00:00:57:676815: sample
  SAMPLE: sw_if_index 1, next index 0
00:00:57:676819: TenGigabitEthernet82/0/0-output
  TenGigabitEthernet82/0/0
  ARP: ff:ff:ff:ff:ff:ff -> 90:e2:ba:84:1c:3a
  request, type ethernet/IP4, address size 6/4
  90:e2:ba:84:1c:3a/100.1.0.2 -> 00:00:00:00:00:00/100.1.0.1
00:00:57:676821: TenGigabitEthernet82/0/0-tx
  TenGigabitEthernet82/0/0 tx queue 1
  buffer 0x48d5: current data 0, length 60, free-list 0, totlen-nifb 0, trace 0x3
  ARP: ff:ff:ff:ff:ff:ff -> 90:e2:ba:84:1c:3a
  request, type ethernet/IP4, address size 6/4
  90:e2:ba:84:1c:3a/100.1.0.2 -> 00:00:00:00:00:00/100.1.0.1
```


Trace(override)

VPP16.09

```
PING 100.1.0.1 (100.1.0.1) from 100.1.0.2

00:10:38:919208: dpdk-input
  TenGigabitEthernet82/0/0 rx queue 0
  buffer 0x4ddc: current data 0, length 60, free-list 0, totlen-nifb 0, trace 0x1
  PKT MBUF: port 0, nb_segs 1, pkt_len 60
    buf_len 2176, data_len 60, ol_flags 0x0, data_off 128, phys_addr 0x7aff0840
    packet_type 0x0
  ARP: 90:e2:ba:84:1c:3a -> 90:e2:ba:84:45:b2
  reply, type ethernet/IP4, address size 6/4
  90:e2:ba:84:1c:3a/100.1.0.2 -> 90:e2:ba:84:45:b2/100.1.0.1
00:10:38:919217: pppoe-input
  PPPOE: sw_if_index 1, next index 3
00:10:38:919244: ethernet-input
  ARP: 90:e2:ba:84:1c:3a -> 90:e2:ba:84:45:b2
00:10:38:919263: arp-input
  reply, type ethernet/IP4, address size 6/4
  90:e2:ba:84:1c:3a/100.1.0.2 -> 90:e2:ba:84:45:b2/100.1.0.1
00:10:38:919290: error-drop
  arp-input: ARP replies received
```

Vlib Graph

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```
DBGvpp# show vlib graph
dpdk-input                ip4-input-no-checksum [0]
                                ip6-input [1]
                             mpls-gre-input [2]
                             ethernet-input [3]
                               error-drop [4]

Override by
dpdk_set_next_node (DPDK_RX_NEXT_ETHERNET_INPUT, "pppoe-input");
then

DBGvpp# show vlib graph
…
dpdk-input                ip4-input-no-checksum [0]
                                ip6-input [1]
                             mpls-gre-input [2]
                               pppoe-input [3]
                               error-drop [4]
…

ppp-input                      error-punt [0]
                               error-drop [1]
                                osi-input [2]
                                ip4-input [3]
                                ip6-input [4]

pppoe-discovery                error-drop [0]              pppoe-input

pppoe-input                     ip4-input [0]              dpdk-input
                                ip6-input [1]           handoff-dispatch
                             mpls-gre-input [2]
                             ethernet-input [3]
                             pppoe-discovery [4]
                              pppoe-session [5]

pppoe-session                  error-drop [0]              pppoe-input
<etc>
```