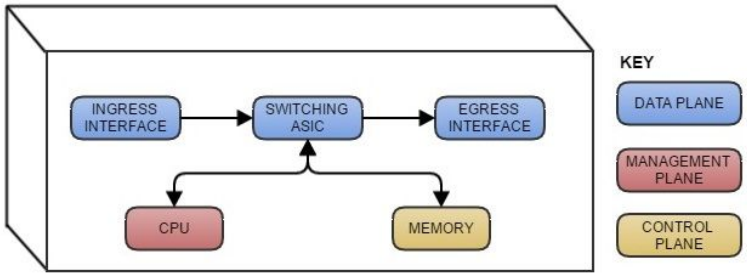
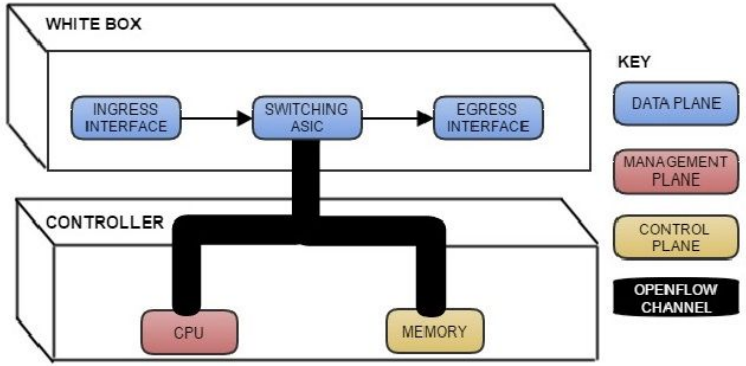
Software Defined Networking

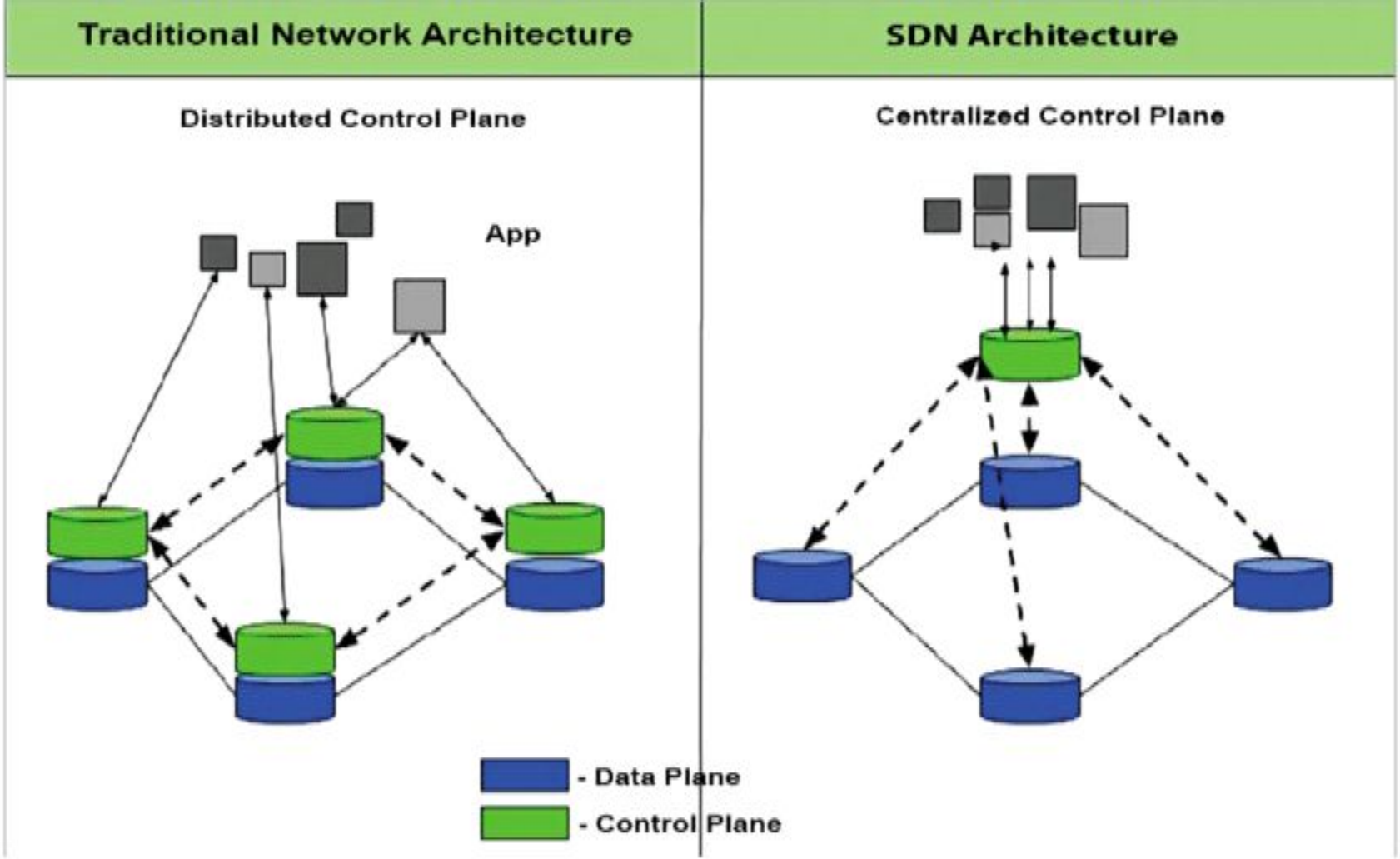
OpenFlow

Traditional Switch



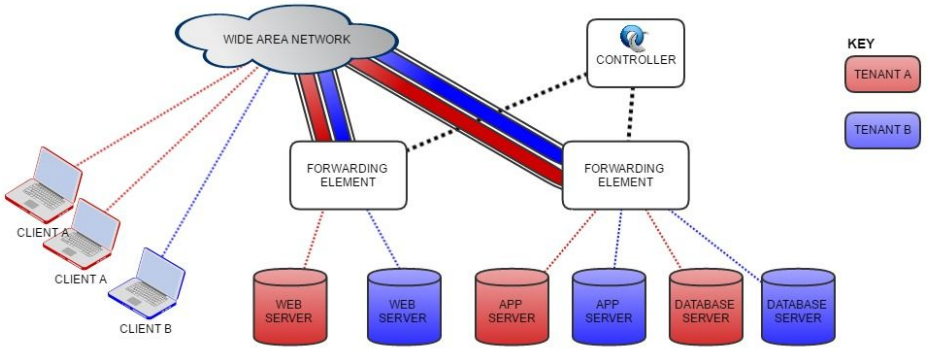
SDN Switch




Traditional Network Architecture
SDN Architecture
Distributed Control Plane
Centralized Control Plane
App
- Data Plane
- Control Plane

Use Cases

- Load Balancing
- Routing
- Packet-level Metrics
- Intrusion Detection



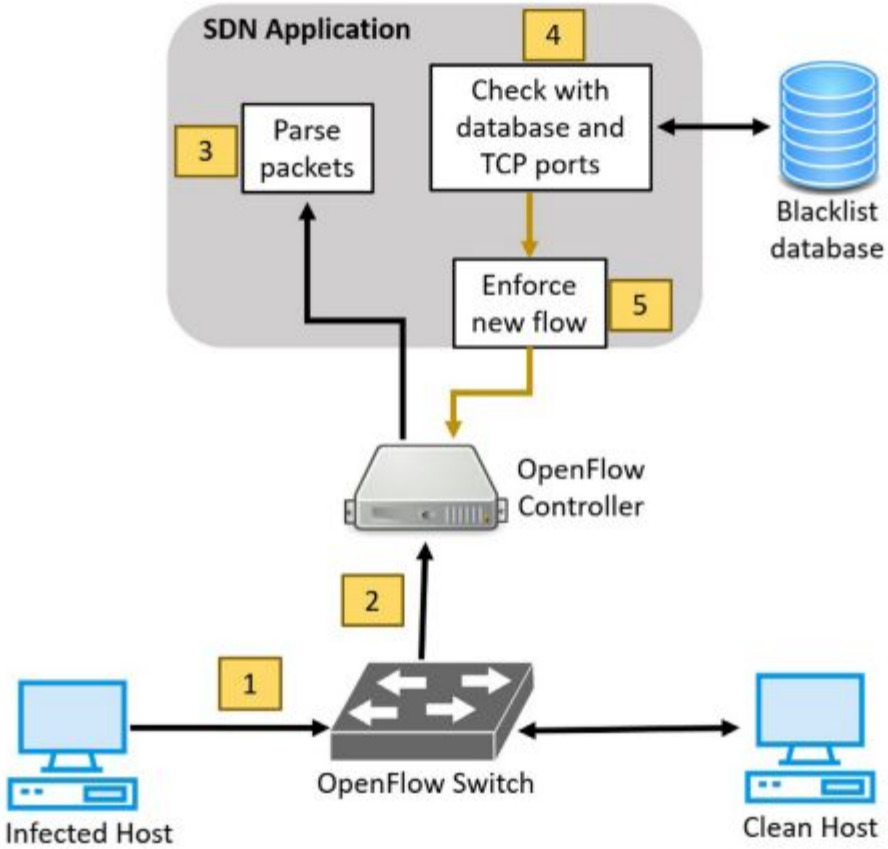
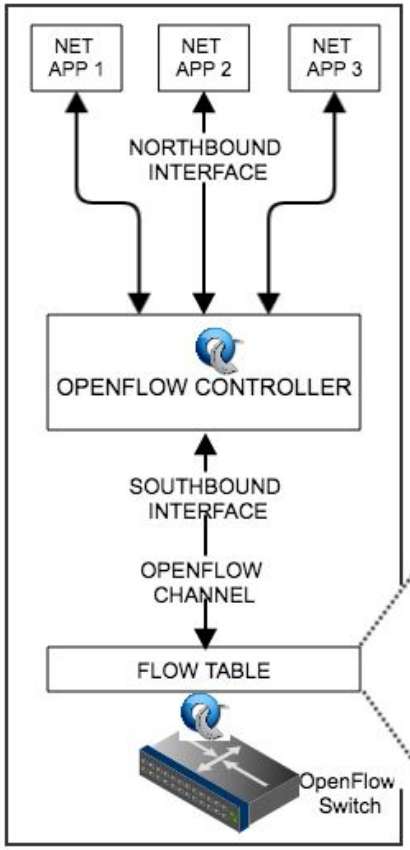


Fig. 7. Conceptual design of the proposed SDN-based mechanism.

OpenFlow

- Relies completely on the controller for forwarding
- Flow Table - Performs packet look-ups
  - Match Fields - Headers, ingress and metadata
  - Counters - collects statistics for a flow
  - Actions - Applies to a match
  - Priority - Priority of flow entries
  - Timeouts - How long a flow entry should last
  - Cookies - Used to filter flow entries
  - Flags - Alter the way flows get managed.

Header



HEADER FIELD

Port	Src MAC	Dst MAC	Ether Type	VLAN ID	VLAN Priority	Src IP	Dst IP	IP Protocol	IP ToS bits	Src TCP/UDP port	Dst TCP/UDP port	Action	Counter	Priority	Timeouts	Cookies	Flags
*	*	C8:0A:	*	*	*	*	10.2.2.5	*	*	*	*	Port 1	234	10	10	*	*
*	*	*	*	*	*	*	10.4.1.6	*	*	*	*	Port 2	333	12	13	*	*
*	*	*	*	*	*	*	*	*	*	*	*	Drop	103	30	*	*	*
*	*	*	*	*	*	*	192.168.1.10	*	*	*	*	Local	231	4	*	*	*
*	*	*	*	*	*	*	*	*	*	*	*	Controller	18	1	*	*	*

Actions

Required Actions

- Forward
  - ALL
  - CONTROLLER
  - LOCAL
  - TABLE
  - IN_PORT
- Drop

Optional Actions

- Forward
  - NORMAL
  - FLOOD
  - ENQUEUE
- Modify Field
  - VLAN_ID
  - ETH_SRC or ETH_DST
  - TCP\UDP