Software Engineer Technical Assessment

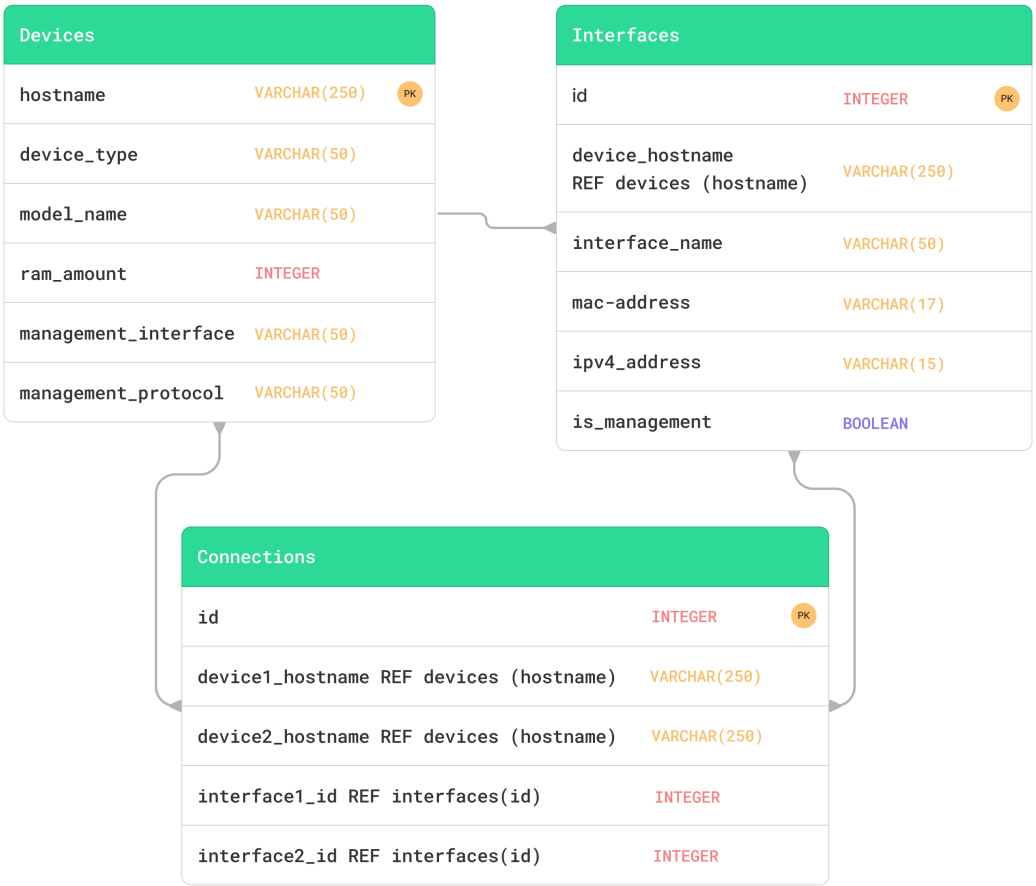
Applicant: Mr Sanjaykumar Ramachandran

Vacancy Reference: ASK990650

Requirements

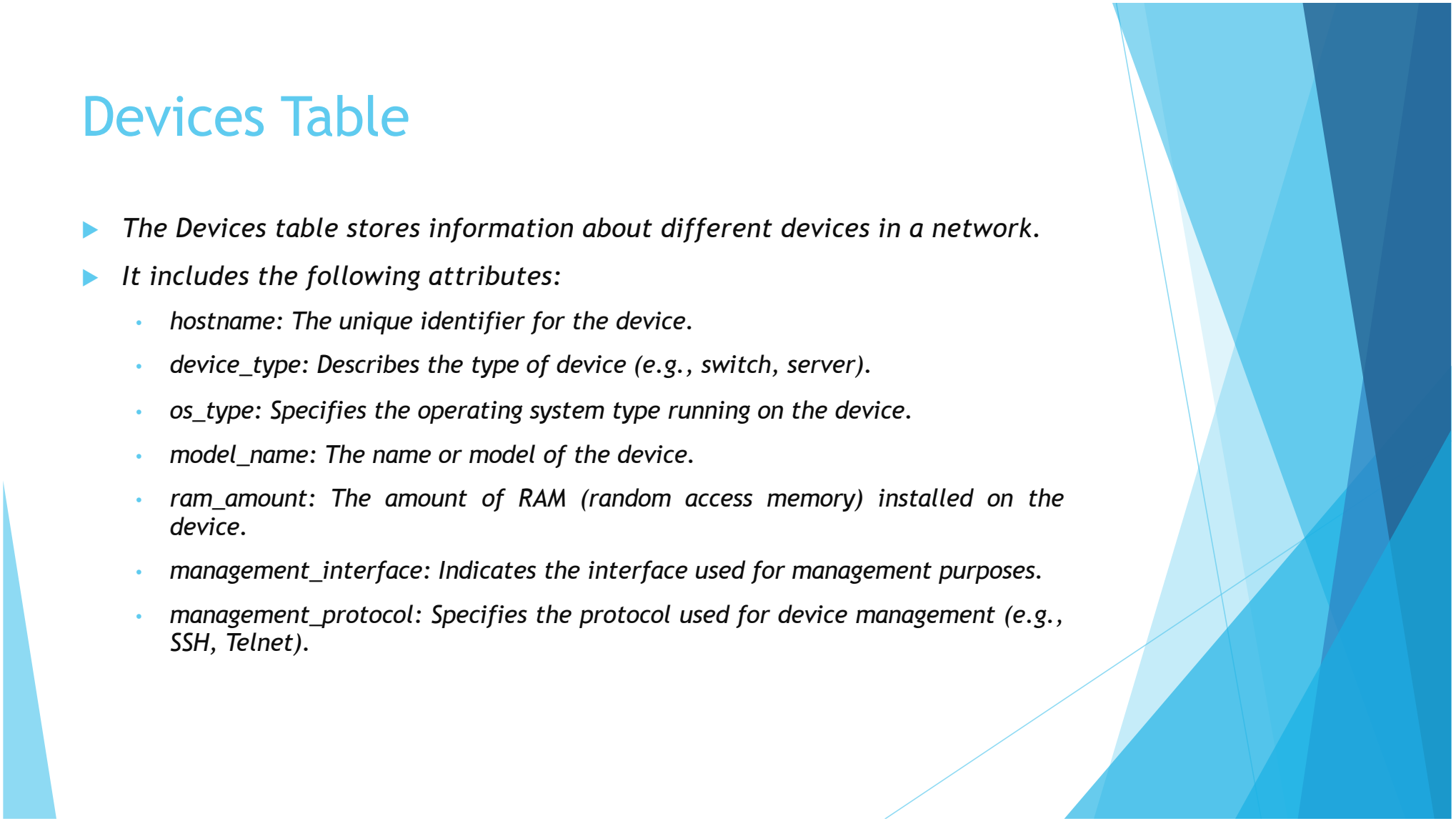
- *The script will take a single argument: the hostname of the device.*
- *The script will query the database to retrieve essential information about the device management interface.*
- *Depending on the type of management interface, it will utilize either the `SSHClient` or`TelnetClient` class to establish a connection to the device and execute a command to list interface configurations.*
- *The script will parse the command output according to the operating system of the device and extract relevant interface details.*
- *It will then print the name, MAC address, and IP address of each interface in CSV format, with one interface per line.*
- *Furthermore, I aim to ensure that the code is easily extendable to accommodate additional operating systems with varying command formats and response structures.*
- *Lastly, the design of the script will emphasize modularity and abstraction to facilitate future modifications or additions.*

Database Design



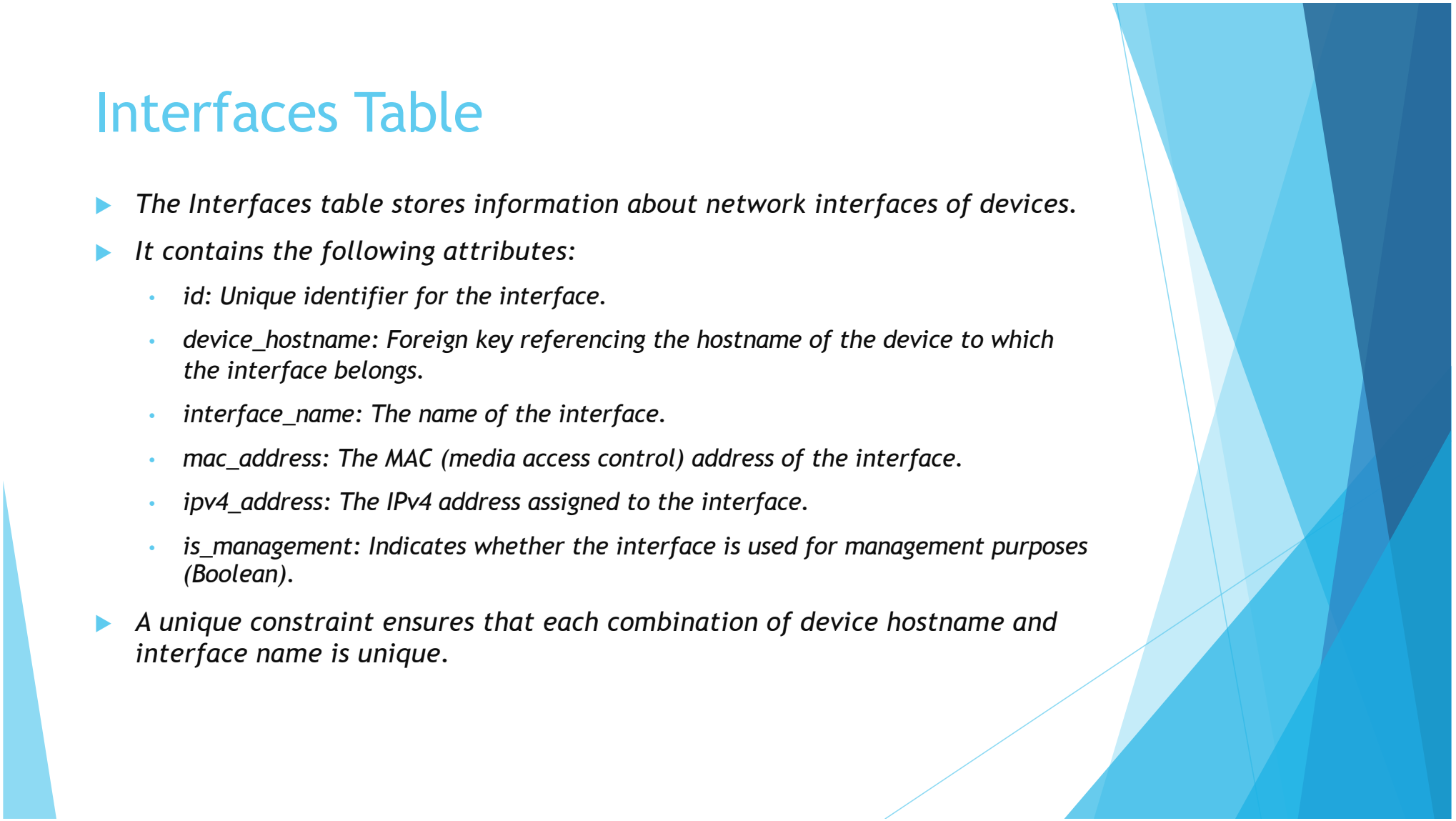
Devices Table

- *The Devices table stores information about different devices in a network.*
- *It includes the following attributes:*
  - *hostname: The unique identifier for the device.*
  - *device_type: Describes the type of device (e.g., switch, server).*
  - *os_type: Specifies the operating system type running on the device.*
  - *model_name: The name or model of the device.*
  - *ram_amount: The amount of RAM (random access memory) installed on the device.*
  - *management_interface: Indicates the interface used for management purposes.*
  - *management_protocol: Specifies the protocol used for device management (e.g., SSH, Telnet).*



Interfaces Table

- *The Interfaces table stores information about network interfaces of devices.*
- *It contains the following attributes:*
  - *id: Unique identifier for the interface.*
  - *device_hostname: Foreign key referencing the hostname of the device to which the interface belongs.*
  - *interface_name: The name of the interface.*
  - *mac_address: The MAC (media access control) address of the interface.*
  - *ipv4_address: The IPv4 address assigned to the interface.*
  - *is_management: Indicates whether the interface is used for management purposes (Boolean).*
- *A unique constraint ensures that each combination of device hostname and interface name is unique.*



Connections Table

- *The Connections table represents connections between devices.*
- *It includes the following attributes:*
  - *id: Unique identifier for the connection.*
  - *device1_hostname: Foreign key referencing the hostname of the first device in the connection.*
  - *device2_hostname: Foreign key referencing the hostname of the second device in the connection.*
  - *interface1_id: Foreign key referencing the ID of the interface on the first device.*
  - *interface2_id: Foreign key referencing the ID of the interface on the second device.*
- *A unique constraint ensures that each combination of device1_hostname and device2_hostname is unique, preventing duplicate connections between the same devices.*

Outputs

```
➜  src php NetworkManager.php device1
Management Interface: eth0
MAC Address: 00:11:22:33:44:55
IPv4 Address: 192.168.1.1
OS Type: LinuxOS
Management Protocol: SSH

Interface|   IP Address          |   MAC Address
enp3s0   |   10.50.245.40   |   fc:aa:14:6d:39:ae
virbr0   |   192.168.122.1   |   52:54:00:e7:dd:dc
virbr1   |   192.168.125.1   |   52:54:00:12:0d:4a
➜  src
```

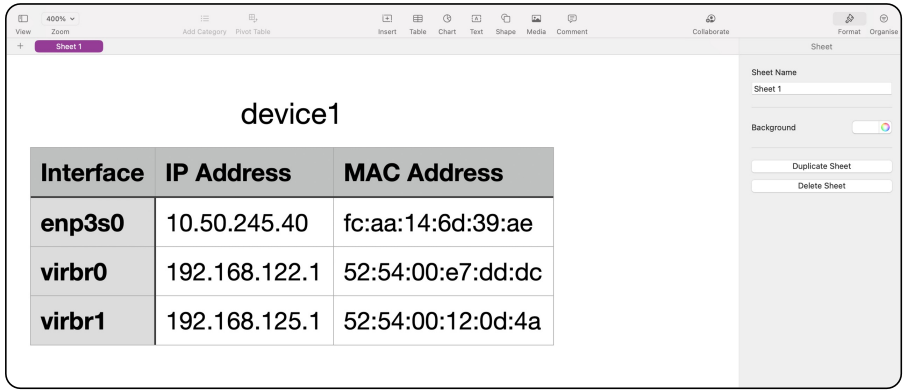
1. Interfaces extracted from LinuxLikeOS response

```
➜  src php NetworkManager.php device2
Management Interface: vlan1
MAC Address: 11:22:33:44:55:66
IPv4 Address: 192.168.1.3
OS Type: SwitchOS
Management Protocol: Telnet

Interface|   IP Address          |   MAC Address
Ethernet0/0   |   10.1.0.1   |   0003.e39b.9220
GigabitEthernet0/1   |   1.2.0.1   |   0015.5b46.5300
➜  src
```

2. Interfaces extracted from SwitchLikeOS response

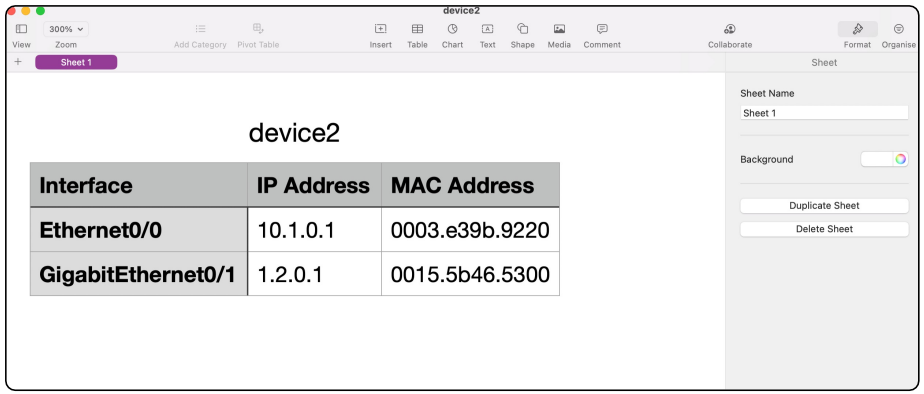
Output-CSV



device1

Interface	IP Address	MAC Address
enp3s0	10.50.245.40	fc:aa:14:6d:39:ae
virbr0	192.168.122.1	52:54:00:e7:dd:dc
virbr1	192.168.125.1	52:54:00:12:0d:4a

device1.csv



device2

Interface	IP Address	MAC Address
Ethernet0/0	10.1.0.1	0003.e39b.9220
GigabitEthernet0/1	1.2.0.1	0015.5b46.5300

device2.csv

Unit testing

```
➜  src phpunit --testdox
PHPUnit 11.0.9 by Sebastian Bergmann and contributors.

Runtime:       PHP 8.3.4
Configuration: /Users/sanjay/Downloads/ask4-developer-test/src/phpunit.xml

.......                                                           7 / 7 (100%)

Time: 00:00.094, Memory: 8.00 MB

Device Client
 ✔ S s h client send command
 ✔ Telnet client send command

Get Management Int
 ✔ Constructor
 ✔ Get management interface details with valid hostname
 ✔ Get management interface details with invalid hostname

Linux OS
 ✔ Linux o s parse handler

Switch OS
 ✔ Switch o s parse handler

OK (7 tests, 14 assertions)
➜  src
```