Wi-Fi Security

Conversation Starter..

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2021 Magic Quadrant

CHALLENGERS — LEADERS
Juniper
HPE (Aruba)
Cisco — Extreme Networks
Fortinet — Huawei
CommScope
ALE
H3C
Arista Networks
Cambium Networks
Allied Telesis — TP-Link
ABILITY TO EXECUTE
COMPLETENESS OF VISION — As of Sep 2021 © Gartner, Inc
NICHE PLAYERS — VISIONARIES

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Primary Security Options

802.1x EAP

Best Option – but can be complex to deploy

Pre Shared Key

Issues – Privacy – Key Management Etc
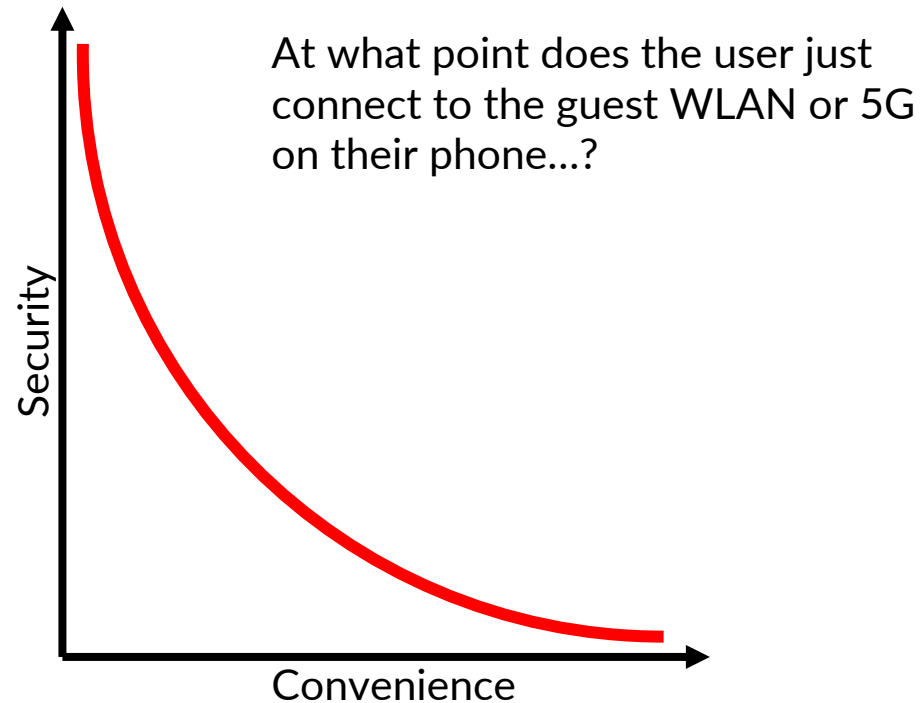
Open / Captive Portal

Traditional Guest Access – Mac Issues, HTTPS, CNA

Security Considerations

Security is a large part of the user experience – ensuring the right solution is a challenge!

At what point does the user just connect to the guest WLAN or 5G on their phone...?

Video Credit: https://10guards.com/en/
Original Link: https://www.youtube.com/watch?v=84gvEKJiJzc

Networks are changing…

Juniper Business Use Only
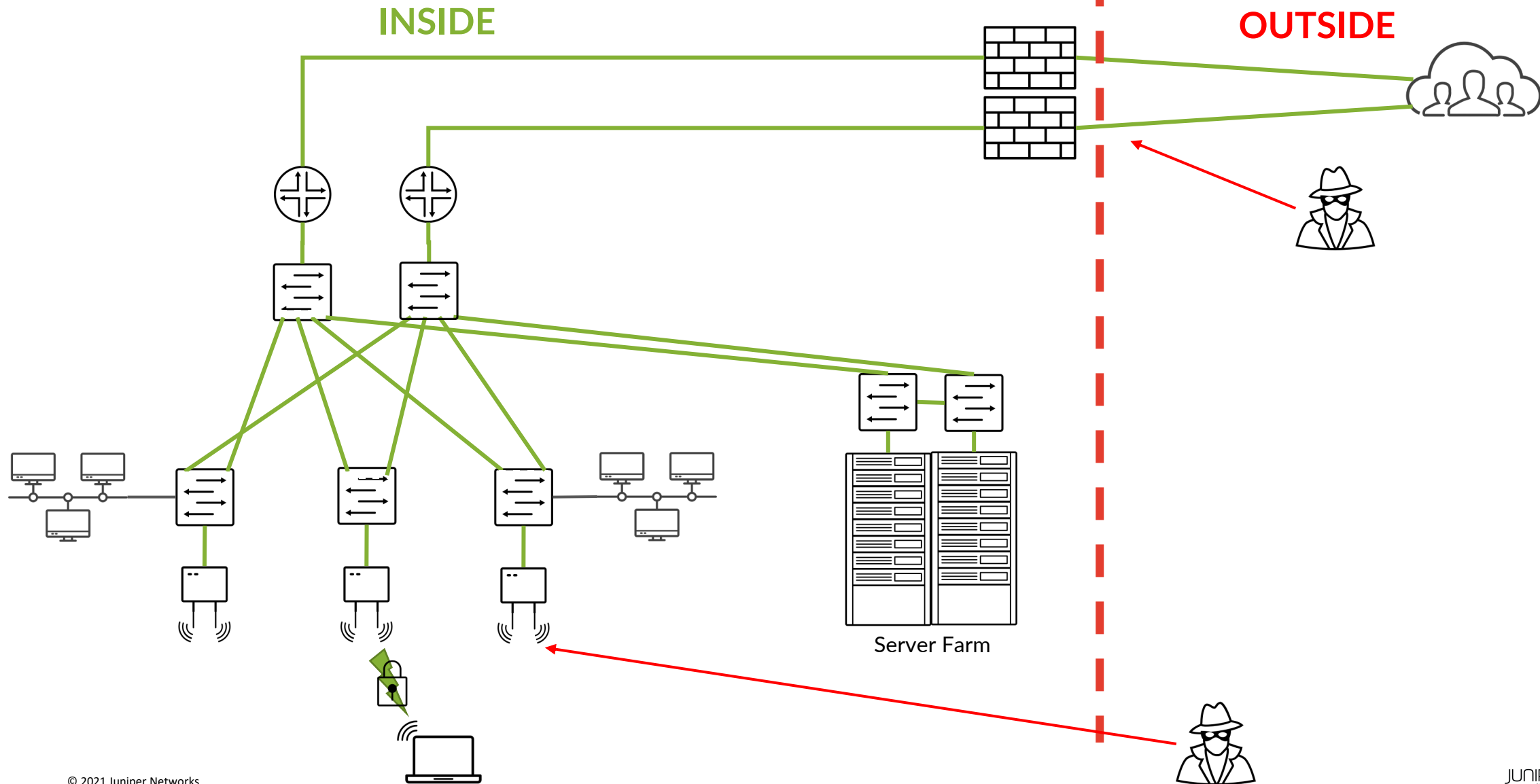
2025 Corporate Network - Glorified Hotspot..?
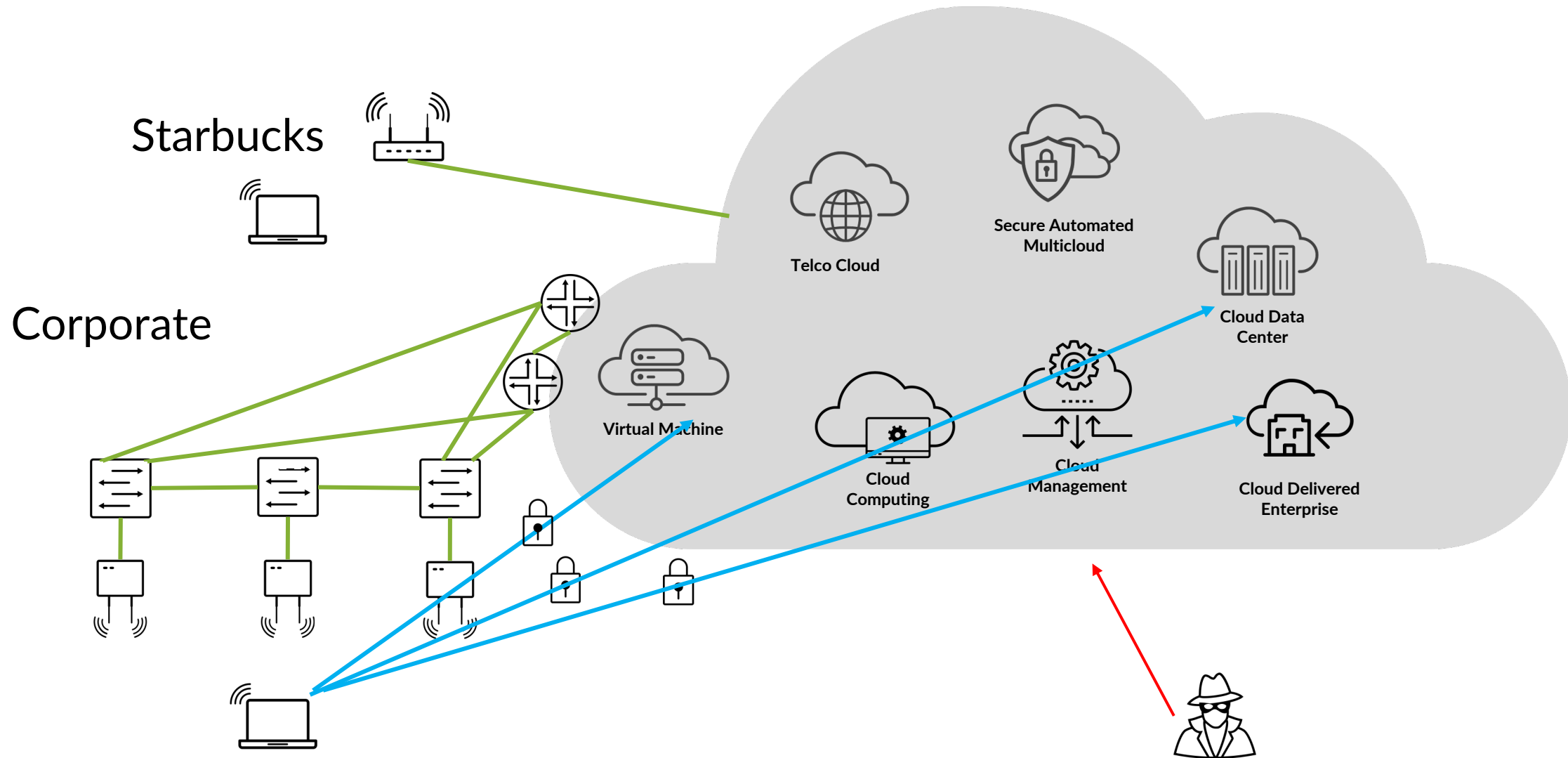
MPSK / PPSK / DPSK – Many versions!

- Addressing the main issues with the traditional PSK
    - Single key – gets shared – no audit trial
    - Single key – almost impossible to manage rotation
    - Single key – all users are the same per SSID
    - SSID proliferation for client differentiation

- Multiple Pre Shared Key
    - Key per user / application / type of device
    - Multiple VLAN support
    - Key rotation made simpler
    - Single SSID – unlimited types of user

Visitor Guest Management – Seamless & Secure

Sponsored Guest Access

Integrated - Personal PreShared Key

✓ Provision a unique, temporary code for each visitor

✓ Share credentials via email and or text message with visitors

✓ No more insecure guest network policies, with one password for all

Juniper Business Use Only

IOT – Real Customer Example

- Large distributed retailer – 18,000 sites

- 10 IOT VLANs defined

- Different PSK per device type per VLAN per site

- Around 200,000 keys in the system – only valid on relevant site

- Managed automatically through API – from Service Now & Netbox

- Each PSK has a policy attached to only allow specific service

- Key value is very low in real terms

Wi-Fi User Authentication

- 802.1X usual route to secure connection
  - Positives:
    - VLAN derivation
    - Role based access
    - Firewall based on role
  - Negatives
    - Radius server infrastructure required
    - Complex to configure and maintain (client and IT)
    - Limited options in cloud first deployments

- Multiple Pre Shared Key
  - Positives:
    - Same VLAN, Role based access and firewall rules
    - Simple setup from corporate and end user perspective
    - Traceable key sharing and device control
  - Negatives
    - Not as secure as 802.1X

Edit Pre-Shared Key ✕

Key Name

Guest_001_PSK

SSID

Guest-PSK ▼

VLAN

101

(1 - 4094)

Passphrase

••••••••••••   Reveal

Characters: 8   Generate Random

Expiration Date

Duration ▼

Expire in: 6   Months ▼

Usage

Multiple users ▼

Max Usage

(Please contact Mist for firmware)

○ Unlimited devices   ● Set number of devices

3

Role

(Please contact Mist for firmware)

GuestUser

Save   Cancel

Juniper Business Use Only

MPSK as a corporate connection – Customer concept

- Device connects with well known PSK – which allows access to registration site

- User authenticates and generates a unique key / policy pair auto installed on laptop

- Device re-connects with new PSK

- Periodically – background task on laptop creates a new PSK
    - Laptop uses Mist API to push new PSK into MIST cloud
    - Laptop connects using the new PSK to validate it works
    - Laptop then deletes it's old PSK in the Mist API
    - Self rotating keys!

- Keys don't have to be Password1234 – they can contain any ASCI character

- API automation removes the need to have human readable keys

API is Key!

Get Update Delete Org Psk

```
GET /api/v1/orgs/9777c1a0-6ef6-11e6-8bbf-02e208b2d34f/psks/12139591-3e45-4701-81bc-56824acabfca

HTTP 200 OK
Allow: DELETE, GET, OPTIONS, PUT
Content-Type: application/json
Vary: Accept

{
    "usage": "multi",
    "id": "12139591-3e45-4701-81bc-56824acabfca",
    "name": "_Member",
    "for_site": false,
    "last_used": null,
    "site_id": "00000000-0000-0000-0000-000000000000",
    "org_id": "9777c1a0-6ef6-11e6-8bbf-02e208b2d34f",
    "created_time": 1635448574,
    "modified_time": 1635448574,
    "ssid": "Live-Demo-MPSK",
    "passphrase": "tQnL+M=h",
    "role": "",
    "expire_time": 1666898123
}
```

DELETE **OPTIONS** **GET** ▾

Media type: application/json

Content:
```
{
"passphrase": "my_new_key"
}
```

PUT

But a great GUI helps.

Manage Key Utilisation

| Active Clients | Registered Clients | | | |

10 Registered Clients ❓

◁ 1-10 of **10** ▷

User	MAC	Site ⌄	Last Seen	Manufac
Dell-PK	1a:97:16:d4:c1:26	Philip Keeley	01:58:54 AM, Nov 17	Unknow
amazon-eb979f062	1c:4d:66:a2:73:58	Philip Keeley	02:08:06 AM, Nov 17	Amazo
ClairesiPhone2	1e:b7:c1:9a:1c:68	Philip Keeley	01:25:39 AM, Nov 17	Apple
amazon-741cfc879	20:a1:71:06:4b:c1	Philip Keeley	02:03:27 AM, Nov 17	Amazo
pkeeley-mbp	38:f9:d3:96:39:31	Philip Keeley	01:46:03 AM, Nov 17	Apple
OnePlus-8-Pro	4c:4f:ee:de:57:47	Philip Keeley	02:48:39 AM, Nov 16	OnePlu
Apple-TV	70:73:cb:c8:a9:1d [4c:4f:ee:de:57:47] eley	02:00:17 AM, Nov 17	Apple
LAPTOP-DE2MO9P6	80:91:33:85:2f:33	Philip Keeley	01:54:13 AM, Nov 17	AzureW
Philips-MBP	98:01:a7:ad:51:f1	Philip Keeley	04:20:39 AM, Nov 16	Apple
localhost	a8:10:87:b3:31:9c	Philip Keeley	10:28:15 AM, Nov 16	Texas I

| Active Clients | Registered Clients | | | |

6 Active Clients ❓

◁ 1-6 of **6** ▷

User	MAC	Site ⌄	Last Seen	Manufact
Dell-PK	1a:97:16:d4:c1:26	Philip Keeley	01:58:54 AM, Nov 17	Unknow
amazon-eb979f062	1c:4d:66:a2:73:58	Philip Keeley [Philip Keeley]	02:08:06 AM, Nov 17	Amazor
ClairesiPhone2	1e:b7:c1:9a:1c:68	Philip Keeley	01:25:39 AM, Nov 17	Apple
amazon-741cfc879	20:a1:71:06:4b:c1	Philip Keeley	02:03:27 AM, Nov 17	Amazor
pkeeley-mbp	38:f9:d3:96:39:31	Philip Keeley	01:46:03 AM, Nov 17	Apple
Apple-TV	70:73:cb:c8:a9:1d	Philip Keeley	02:00:17 AM, Nov 17	Apple

So is a single SSID possible?

6 **Pre-Shared Keys**

Reveal Passphrases | Import | Export | Add Key

SSID

Single-WLAN	6

Role

CorpUser	2
GuestUsers	2
meetpad	1
printer	1

Expiring Keys

Within 1 Month	0
Within 1 Week	2
Within 1 Day	0

Filter 🔍

1-6 of **6**

	Key Name	⌃ MAC	Created Time	Modify Time	Passphrase	Expiration	Max Usage	Usage	SSID	VLAN ID	Role	Actions
☐	Corp_User_001		Nov 17, 2021 02:43:16 AM	Nov 17, 2021 02:43:16 AM	********		Unlimited	Multiple users	Single-WLAN	201	CorpUser	🗑
☐	Corp_User_002		Nov 17, 2021 02:34:25 AM	Nov 17, 2021 02:43:25 AM	********		Unlimited	Multiple users	Single-WLAN	201	CorpUser	🗑
☐	Guest_001		Nov 17, 2021 02:33:39 AM	Nov 17, 2021 02:33:39 AM	********	Nov 22, 2021 02:33:03 AM	2 Max	Multiple users	Single-WLAN	101	GuestUsers	🗑
☐	Guest_002		Nov 17, 2021 02:33:19 AM	Nov 17, 2021 02:33:49 AM	********	Nov 22, 2021 02:33:03 AM	2 Max	Multiple users	Single-WLAN	101	GuestUsers	🗑
☐	IOT_Meeting_Room_Pad		Nov 17, 2021 02:45:40 AM	Nov 17, 2021 02:45:40 AM	********	Jan 1, 2023 07:30:00 AM	10 Max	Multiple users	Single-WLAN	302	meetpad	🗑
☐	IOT_Printer		Nov 17, 2021 02:44:20 AM	Nov 17, 2021 02:44:20 AM	********		5 Max	Multiple users	Single-WLAN	301	printer	🗑

Thank you

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