# WAN – WIDE AREA NETWORK

- ✓ Default Cisco Router Serial Encapsulation is HDLC- (High level data link controller)
  - **# sh int s0**
- ✓ Default Cisco Router Ethernet encapsulation is ARPA- (Advanced research projectagencies)
  - **# sh int e0**

## PPP authentication: (Point to Point Protocol)

The calling side of the link must transmit information to ensure that the sender is authorized to establish the connection. This is accomplished by the series of authentication message between the Routers. PPP supports two types of authentication:

**PAP:** Password Authentication Protocol. (supports 1 way and 2 way Authentication)

**CHAP:** Challenge handshake authentication protocol. (supports three way Authentication)
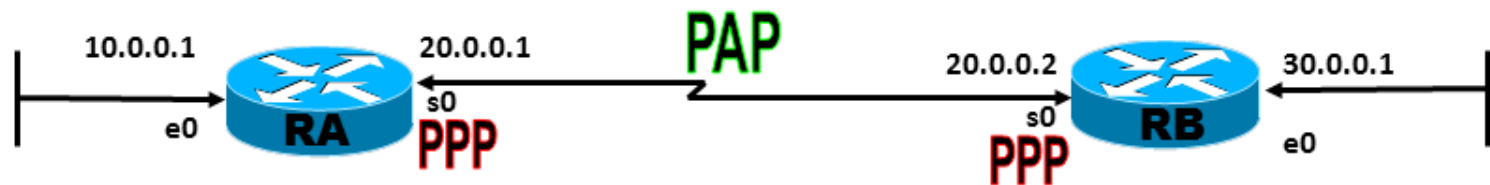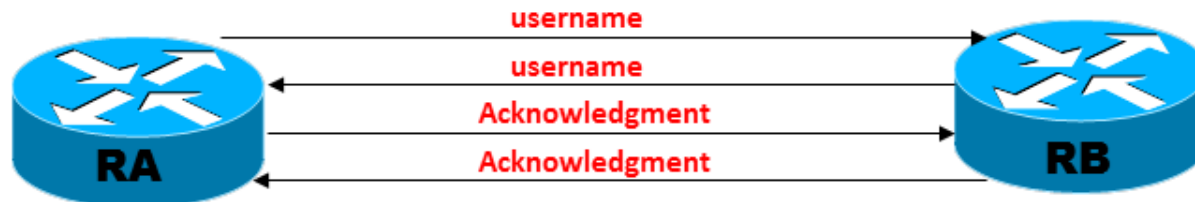
# PAP (Password Authentication Protocol)

✓     PAP uses two-way handshake to allow remote hosts to identify themselves. After the link has been established and the link establishment phase is complete, PAP performs the following steps:

✓     The remote host initiates the call, sends a username and password to the local host, and continues to send the information until it is accepted or rejected.

✓     The local host receives the call and accept or rejects the username and password information. if the local host rejects the information , the connection is terminated.

# PAP (Password Authentication Protocol)

RA → username → RB
RA ← username ← RB
RA → Acknowledgment → RB
RA ← Acknowledgment ← RB

**AUTHENTICATION**

Username : trichy
Password : 123

Username : chennai
Password : abc

Username : chennai
Password : abc

Username : trichy
Password : 123

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10.0.0.1 — e0 — RA — s0 — 20.0.0.1 — **PAP** — 20.0.0.2 — s0 — RB — e0 — 30.0.0.1

**PPP**     **PPP**

## RA

```
# Configure Terminal
# username trichy password 123
# int e0
# ip add 10.0.0.1 255.0.0.0
# No sh
# int s0
# encapsulation ppp
# ip add 20.0.0.1 255.0.0.0
# no sh
# router eigrp 100
# network 10.0.0.0
# network 20.0.0.0
# Int s0
# ppp pap sent-username chennai password abc
# ppp authentication pap
```

## RB

```
# Configure Terminal
# username chennai password abc
# int e0
# ip add 30.0.0.1 255.0.0.0
# No sh
# int s0
# encapsulation ppp
# ip add 20.0.0.2 255.0.0.0
# no sh
# router eigrp 100
# network 20.0.0.0
# network 30.0.0.0
# Int s0
# ppp pap sent-username trichy password 123
# ppp authentication pap
```

## RA & RB

```
# debug ppp authentication
```

## RA or RB

```
# int s0
# sh
# no sh
```
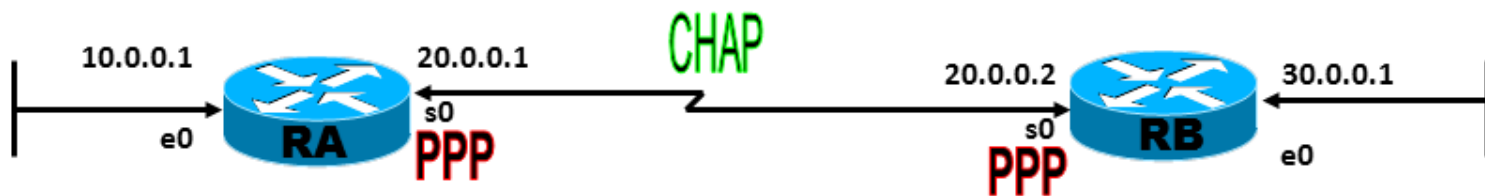
# CHAP (Challange Handshake Authentication Protocol)

✓       CHAP uses a three way handshake to force remote hosts to identify themselves after the link establishments phase. CHAP performs the following steps after the link establishment phase is complete:

✓       The local router that received the call sends a challenge packet to the remote host that initiated the call. the challenge packet consists of an ID, a random number, and either the name of the local host performing the authentication or a username on the remote host.

✓       The remote host must respond with its encrypted unique ID, a one – way encrypted password , the remote hostname or a username, and a random number.

✓       The local router performs its own calculation on the response values. It accepts or rejects the authentication request based on whether the value it received from the remote host matches the value it calculated.

✓       Like PAP, CHAP terminates the connection immediately if the local host rejects the authentication.

# CHAP (Challange Handshake Authentication Protocol)

Challenge $\longrightarrow$

Challenge $\longleftarrow$

Acknowledgment $\longrightarrow$

Acknowledgment $\longleftarrow$

success $\longrightarrow$

success $\longleftarrow$

RA                    RB

**AUTHENTICATION**

| Hostname : RA |
| Username : RB  Password : 123 |

| Hostname : RB |
| Username : RA  Password : 123 |

**Password Must Be Same**

10.0.0.1    RA    20.0.0.1    CHAP    20.0.0.2    RB    30.0.0.1

e0    s0    PPP    s0    PPP    e0

## RA
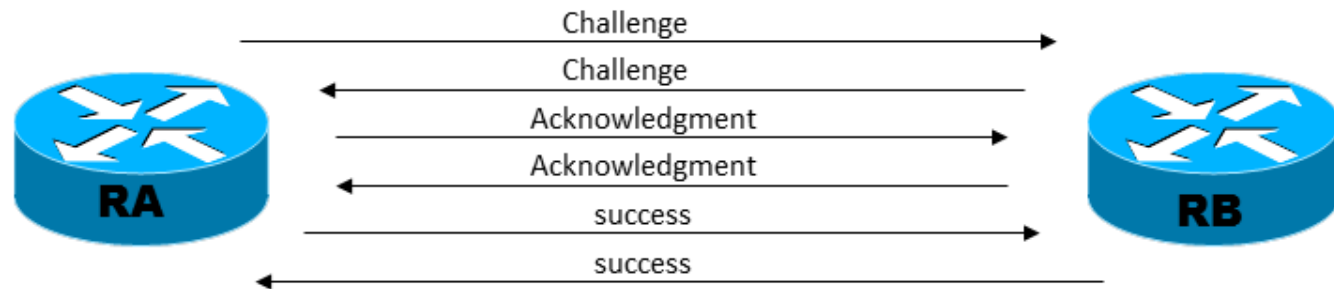
```
# Configure Terminal
# hostname ra
# int e0
# ip add 10.0.0.1 255.0.0.0
# No sh
# int s0
# encapsulation ppp
# ip add 20.0.0.1 255.0.0.0
# no sh
# router eigrp 100
# network 10.0.0.0
# network 20.0.0.0
```

## RB

```
# Configure Terminal
# hostname rb
# int e0
# ip add 30.0.0.1 255.0.0.0
# No sh
# int s0
# encapsulation ppp
# ip add 20.0.0.2 255.0.0.0
# no sh
# router eigrp 100
# network 20.0.0.0
# network 30.0.0.0
```

## CHAP

```
# configure terminal
# username rb password 123
# int s0
# ppp authentication chap
```

```
# configure terminal
# username ra password 123
# int s0
# ppp authentication chap
```

**RA & RB**   # debug ppp authentication

**RA or RB**
```
# int s0
# sh
# no sh
```

# Cisco Packet Tracer

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