COMPUTER NETWORING.

ASSIGNMENT-5.

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Scenario : A mobile app uses PoP to retrieve emails.

* Explain PoP3 session flow.

A typical PoP3 session has three phases :

① Authorization phase :

• Goal : The client (mobile app) authenticates to the mail server.

• The client establishes a TCP connection to the PoP3 server on port 110.

• The server sends a greeting message.

② Transaction Phase :

• Goal : The client retrieves and messages email messages.

• The client downloads emails from the server. Typically, emails are removed from the server. unless the client is configured.

③ Update Phase :

• Goal : Finalize the session and delete message if marked.

• The client sends the Quit command.

④ In a mobile APP :

• The app may check emails periodically.

• It initiates a new PoP3 session each time it checks.

• May download and delete or download and retain based on user settings.

* Determine storage needed for 1000 users receiving 15MB day emails.

- Each user receives 15 MB/day of emails.
- There are 1000 users.
- Storage requirement depends on how long the emails are kept on the server.

Case-1: Emails are deleted immediately after retrieval.

Total Storage needed = very minimal.

Emails are downloaded and deleted, so long-term storage is not needed.

Case-2: Emails are stored for x days (eg., for backup or delayed retrieval).

Calculation:
- Per user per day : 15 MB.
- Per user for 7 days : 15 x 7 = 105 MB.
- For 1000 users.

105 MB x 1000 = 105,000 MB = 105 GB.

Retention Period.	Total Storage for 1000 users
1 day	15 GB.
7 days	105 GB.
30 days	450 GB.

* Compare PoP and IMAP.

Feature	PoP (Post office Protocol).
Protocol Port	110 (Pop3), 995 (POP3S).
Storage location	Emails are download to client device.
Sync Across devices	No Sync (each device acts independently)
Offline Access	After download, Emails are available
Folder support	No folder support.
Security	Supports SSL/TLS.
Mobile suitability	limited, basic functionality.

- PoP: Best for simple, low-bandwidth use single device.
- IMap: Best for modern usage - multiple devices, cloud sync, and better email management.

In a mobile app, IMAP is generally preferred for features like:

- Real-time sync.
- Access to all folders (eg., Inbox, sent, drafts).
- Better user experience.
- Mobile suitability limited., basic functionality.
- Search. Capability only on local device.
- Bandwidth usage lower (downloads once).

* Suggest caching mechanisms for slow connections.

1. Local message caching : store downloaded emails locally on the device after retrieval.

- Avoids re-downloading the same message.
- Enables offline access even when connectivity is poor.

2. Header-only caching.

- Download and cache only email headers initially.
- Full messages body and attachments are fetched on demand.

3. Incremental sync caching.

- Fetch and cache only new messages since the last session
- Track message IDs locally to avoid duplication.

4. Attachment caching & deferred download.

- Store attachments locally after first download.
- Optionally compress or thumbnail large files for preview.

5. Disk-based persistent cache.

- use device storage (SQLite) to maintain a persistent cache across across sessions.

- Helps is recovery after app restart or disconnection.
- Compress email content before storing in cache.