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Hypermedia Messaging

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Send



What is Hypermedia Messaging?

- Hypermedia messaging is a communication approach that combines elements of hypermedia and messaging to create interactive and dynamic communication experiences in the digital realm
- **Hypermedia** combines text, images, audio, video, and hyperlinks in digital systems, enabling non-linear, interactive content with clickable links for easy access to related resources and actions.
- **Messaging** in communication tech entails sharing text, media (like images, audio, and video), and interactive content among users or systems, spanning instant messaging, email, chat apps, and beyond.
- **Hypermedia messaging** combines both, enabling dynamic, interactive conversations with multimedia and links. It enhances communication by offering context and interactive possibilities, ideal for engaging and sharing information in critical applications.

Importance of Interactive and Dynamic communication in the digital age

1. **Enhanced Engagement:** Interactive and dynamic communication captivates audiences, keeping them engaged, as opposed to static, one-way communication.
2. **Immediate Feedback:** It allows for real-time feedback, facilitating rapid responses and adjustments, crucial in a fast-paced digital environment.
3. **Personalization:** Dynamic content can be tailored to individual preferences, delivering a more personalized and relevant user experience.
4. **Information Richness:** Interactive media and dynamic content convey information more effectively, enhancing comprehension and retention.
5. **Competitive Advantage:** Organizations that adopt interactive and dynamic communication gain a competitive edge by staying relevant and appealing to modern audiences.
6. **Adaptability:** In a rapidly changing digital landscape, dynamic communication can adapt to evolving technologies and user expectations, ensuring continued effectiveness.

Mobile Messaging

Mobile messaging refers to messaging platforms that include E-mail, SMS, instant messaging apps, which have become central to modern communication. They support multimedia content and interactive features.

- Key mobile messaging platforms include SMS, instant messaging apps, and mobile email clients, which have become central to modern communication. They support multimedia content and interactive features.

New Standards for Interplay Among Communication Media Types

- **UMA (Unlicensed Mobile Access):** UMA is a standard that enables seamless handover of voice and data services between cellular and Wi-Fi networks. It allows mobile devices to switch between cellular and Wi-Fi connections without interrupting voice calls or data sessions. UMA promotes uninterrupted communication and helps offload network traffic to Wi-Fi, improving network efficiency.
- **X.400:** X.400 is a messaging standard developed by the International Telecommunication Union (ITU). It defines a set of protocols for email and messaging systems, ensuring interoperability between different email systems. While it's less commonly used for personal messaging, X.400 is essential for secure and standardized communication in business and government sectors.

Hypermedia Message Components

1. Text Messages
2. Rich-Text Messages
3. Voice Messages
4. Full-Motion Video

Text Messages

*this was staged bribing is against the law

Text Messages

- The earliest messaging systems used a limited subset of plain ASCII text. Based initially on teletype technology and later on used as operating system-supported messaging applications.
- New messaging standards have added new capabilities such as class of service, delivery reports (blue-ticks on whatsapp), time stamps and so on.
- Some systems provide extended reporting capabilities as when the recipient actually opened and read the message.

Rich-Text Messages

- Microsoft defined a standard for exporting and importing text data that include character set, font-table, section and paragraph formatting, document formatting and color information called Rich-Text Format(RTF).
- This format is used for storage, import and export of text files across a variety of word-processing and messaging systems. When sections from one document are cut and pasted in another the font and formatting information is retained.
- RTF facilitates to create messages in one word processor and edit it in another application to display the text in nearest equivalent fonts and formats.
- RTF carries format information that includes character sets, font and color tables; document, section, paragraph, general and character formatting; and specialized characters.

Extensions to RTF

- RTF is further extend in two ways (bit-maps, images, icons, and so on)
 - By adding graphics
 - By adding file-attachments
- Bitmaps can be in any of the standard graphic formats such as Windows metafile, Windows bitmaps, TIFF, PCX. It may contain a complete image by itself, a representation of an attachment, or an embedded or linked object. The representation. This representation is in form of icon or button.
- Clicking on the icon with a mouse allows retrieving attachments, or launches the authoring tool or the server application for retrieving and rendering or editing linked objects.

Voice Messages

My voice the
way I hear it.

My voice
when I
hear it s
recording



Voice Messages

- The invention of telephone allowed communications among people dispersed geographically. Over the years telephone became an essential tool for business functions.
- Answering machines have solved the problem of recipient not being able to answer the calls. Later Voicemails have replaced the answering machines, voicemails recorded the message in the case of recipient cannot answer after a certain number of rings.
- Hypermedia messaging systems extend the concept of voicemail to voice messages that are linked in text-based messages.
- From the perspective of a computer there is no difference between a human recorded voice or recorded music other than the quality of sound reproduction.

Voice Messages - Music

- The Musical Instrument Digital Interface (MIDI) was developed initially by the music industry to allow computer control of musical recordings and instruments .
- MIDI interfaces are being used for a variety of peripherals, including digital pianos, digital organs, video games with high fidelity sound output.
- From a hyper media perspective, whether the object is voice or music, it is stored in compressed form on an object server.
- An integrated messaging system allows embedding or linking the music file in MIDI format to the e-mail message.

Full-Motion Video Management

It is easier to watch a video over reading a large document if both of them contain the same information.

- Full-motion video management is a comprehensive system or approach used to handle, process, and maintain video content that captures full-motion, real-time visuals. It is widely employed in various industries, including security and surveillance, entertainment, education, and more

Full Motion Video Authoring Systems

The needed tools for creation and editing of multimedia objects are. The video capture program should contain

- Fast and simple capture of digital video from analog sources such as video camera or videotape
- Compression and decompression interfaces as the video is being captured
- A video editor with the ability to decompress, combine, edit, and compress clips.
- Video indexing and annotation software for marking sections of a video clip and recording annotations
- Identifying and indexing video clips for storage

Full-Motion Video Playback Systems

Eg: VLC media player, Windows media player

These are as important as the authoring systems. They detach the embedded video reference object, interpret its contents, and retrieve the actual video clip from a specialized video server and launch the playback application.

A number of factors are involved in playing back the video correctly.

- Compression format used for storing the video clip relates to the available hardware and software facilities of decompression.
- Resolution of the screen and the system facilities
- CPU processing power and the expected level of degradation

Video for Windows (VFW)

- Microsoft Windows is the most commonly used environment for multimedia messaging. Initially VFW established new components for data interchange, such as common file format for video called the audio visual interleaved(AVI).
- VFW provides capture, edit, playback tools for full motion videos.
- The tools provided by VFW are:
 - The VidCap tool, designed for fast video capture
 - The VidEdit tool, designed for decompression, editing, and compression full-motion digital video
 - The VFW playback tool

VFW takes advantage of the key elements of Windows such as Object Linking and Embedding(OLE) and Dynamic Data Exchange(DDE). VFW provides developers with the ability to add full-motion video to any Windows based application.

Apple's QuickTime

Apple's QuickTime is a multimedia framework and media player developed by Apple Inc. It has historically been used for playing, creating, and streaming audio and video content on Apple's macOS and Windows platforms. QuickTime supports a wide range of codecs and file formats, making it a versatile tool for multimedia applications. However, Apple has gradually phased out QuickTime support on Windows, and in recent macOS versions, it has been replaced by newer technologies. Despite its decreasing prominence, QuickTime has had a lasting impact on multimedia playback and authoring in the digital realm.

Intel's Indeo

- **Codec Technology:** Indeo is a video codec technology used for compressing and decompressing digital video files, primarily in the 1990s and early 2000s.
- It reduces the size of video files through successive compression methodologies, including YUV subsampling, vector quantization, Huffman's run-length encoding and variable content encoding.
- It takes advantage of Intel i750 video processor if it is available in the system.
- It determines the hardware available and optimizes the playback for the hardware by controlling the frame rate.
- The compressed file must be decompressed for playback, it is done dynamically during the playback process.
- It is also provided with VFW

Hypermedia Linking and Embedding

- Linking in Hypertext Documents
 - Linking and Embedding
 - Linking Objects
 - Embedding Objects
 - Design Issues

Hypermedia Linking and Embedding

1. Linking as in hypertext applications. Hypertext systems associated keywords in a document with other documents.
2. Linking multimedia objects is stored separately from the document and the link provides a pointer to its storage. An embedded object is a part of the document and it retrieved when the document is retrieved.
3. Linking and embedding in a context specific to Microsoft Object Linking and Embedding

When a multimedia object is incorporated in a document, its behaviour depends on whether it is **linked** or **embedded**.

Linking Objects

When an object is linked, the source data object, called the **link source** continues to reside wherever it was at the time the link was created. This maybe at the object server where it was created, or where it may have been copied in a subsequent replication.

- Link can contain information about the multimedia object storage, its presentation parameters, and the link reference is transferred, but the actual multimedia document remains at its original locations.
- Note that linked object is not part of the hypermedia document and does not take up the storage space within the hypermedia document.

Embedded Objects

When the multimedia object is embedded, a copy of the object is physically stored in the hypermedia document. In addition, presentation information and the information about the server application that can display/play or edit is also stored.

- Any changes made in the embedded object will not be reflected in the other copies
- Graphics and images can be inserted in a rich-text document or embedded using OLE techniques.
- Voice and audio components can be included in a text message.

Design Issues of Linking and Embedding

Under a distributed environment, OLE creates significant headaches for users if there is incomplete link tracking between documents that have been mailed between PCs and the applications which created the objects.

- Users need robust link tracking across the distributed environment.

Creating Hypermedia Messages

By definition, a hypermedia message can be a complex collection of a variety of objects. While an ordinary text message includes only text, and possibly some input from a spreadsheet, hypermedia may require several more steps for completion namely:

1. Planning
2. Creating each component
3. Integrating components

Integrated Multimedia Message Standards



Vendor Independent Messaging (VIM)

- VIM interface is designed to facilitate messaging between VIM enabled electronic mail systems as well as other applications ie it is implemented as an API.
- It allows developers to provide **mail-aware** and **mail-enabled** applications.
- VIM makes use of of communication using the **store-and-forward** method.
- Messages are delivered to a **container** and each VIM associated system contains one or more of these containers.
- VIM-aware applications also use **address books** to store information about users, groups, applications etc.
- These address books contain information about the message containers of the users, groups and applications referenced in the book.

VIM Messages

- VIM defines messaging as a store-and-forward method of application-to-application or program-to-program data exchange.
- Here is a typical messaging sequence:
 - Sender
 - Uses VIM interface to construct a message.
 - Uses VIM address book to determine the address of the receiver.
 - The message and the address is sent to the messaging system.
 - The messaging system assumes responsibility for routing and delivering the message.
 - Receiver
 - The receiver notices the presence of new messages in its container.
 - Uses VIM interface to read the message.
 - It decides whether to delete, store in container or extract and store elsewhere.

VIM Messages Definition

- Each message has a message type associated with it which defines the **syntax** of the message and the type of information that it can contain.
- For example a **mail message** is a type of message.
- VIM messages contain a **header** at minimum. In addition it may contain one or more **message items**.
- The header consists of attributes like recipient address, originator address etc.
- A message item is an arbitrary-sized data of a defined type.
- A message may also contain file attachments.
- VIM also allows nesting of messages ie a message within another message.
- A VIM message can also be digitally signed.

VIM Mail Message

- A mail message is a message of a well-defined type that must include a message header and may include note parts, attachments and other application defined components.
- Note parts may include texts, bitmaps, pictures, sound, video etc.

VIM Message Delivery

- On successful delivery of a message, a delivery report is generated and sent to the sender if the sender requested for the report.
- If the message cannot be delivered a non-delivery report is sent to the sender.
- A message delivered to a message container remains marked unread until an application calls `VIMOpenMessage()`.
- A receipt is sent to the sender once the message has been opened if the sender requested for it.

VIM Distinguished Names

- The concept of distinguished names is similar to that of X500.
- The name is a unique identity and a client provides its distinguished name for authentication when a session is created.
- A recipient can be addressed based on name and by address.
- The name corresponds to the distinguished name while the address corresponds to the recipient's message container.
- The address book is the repository for all the distinguished names.

VIM Services

- The VIM interface provides a number of services for creating and mailing a message namely
 - Electronic message composition and submission.
 - Electronic message sending and receiving.
 - Message extraction from mail system.
 - Address book services.

MAPI Support

- The focus of MAPI is to provide a messaging architecture instead of just providing a messaging API in Windows.
- MAPI provides a layer of functionality between applications and underlying messaging systems.
- The primary goals of MAPI include:
 - Separate client applications from the underlying messaging services.
 - Make basic mail-enabling a standard feature for all applications.
 - Support messaging-reliant workgroup applications.

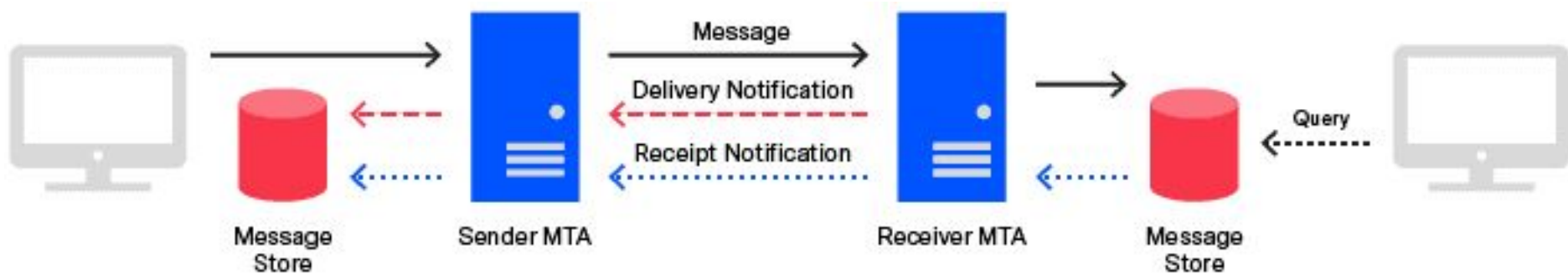
MAPI Architecture

- The MAPI architecture provides two perspectives: a client API and a service provider interface.
- The client API provides the link between the client application and MAPI.
- The service provider interface links the MAPI and the messaging system.
- The two interfaces combine to provide an open architecture such that any messaging application can use any messaging service that has a MAPI driver.

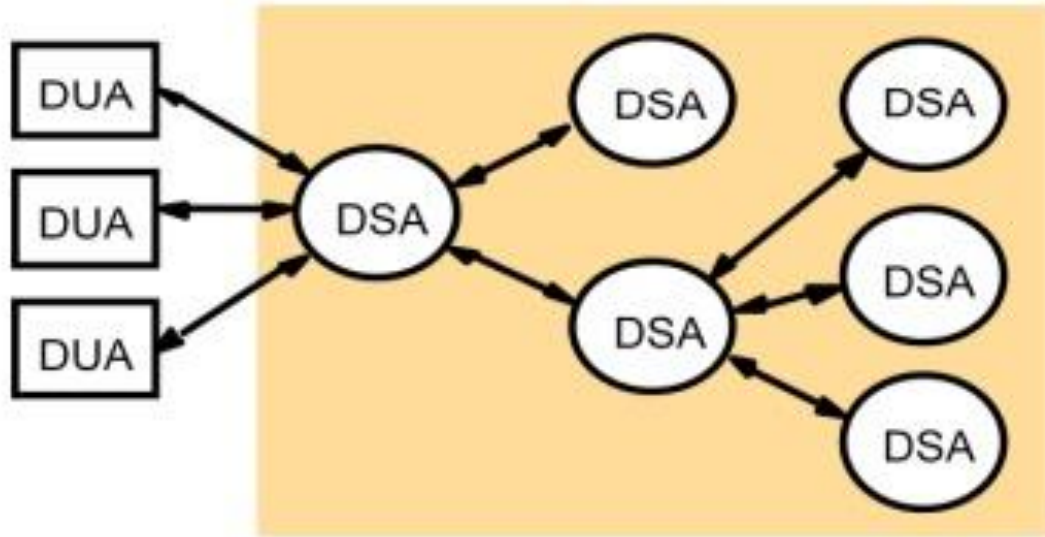
Telephony API

- Telephony is not often considered an integral part of a message-handling system until one views it from the perspective of the telephone being an integral component of the overall messaging interface for the user.
- The telephone can be used for “reading” email using speech recognition remotely.
- The TAPI standard is a perfect example. It has been developed by Microsoft and Intel.

X400 Message Handling Service



X500 Directory System Standards



Internet Messaging

- Here we discuss the Multipurpose Internet Mail Extensions (MIME).
- This specification defines mechanisms for generalising the message content to include multiple body parts and multiple data types.
- The additional functionalities that it provides include:
 - A MIME version header field that distinguishes MIME messages from text-only single-body-part messages.
 - A content-type header field that describes the type and representation of the data in the body parts.
 - A content-transfer encoding methodology to allow non-MIME intermediate hosts to pass messages through their mail transport mechanisms.

Integrated Document Management

- **Integrated Document Management for Messaging:** Specialised messaging systems like Lotus Notes provide this service. This means that users can attach, embed or link a variety of multimedia content. It also allows forwarding of messages.
- **Multimedia Object Server and Mail Server Interactions:** Mail servers is used to store all email messages. It also contains references to multimedia in the form of links and not the actual multimedia object. It is possible in smaller groups to share the same physical resources for storing multimedia content as well as mail files