

Chapter: **Mobile Networks : Transport and Application Layers**

## Wireless Datagram Protocol (WDP)

The Wireless Datagram Protocol (WDP) operates on top of many different bearer services capable of carrying data.

### WWW Programming Model

#### Wireless Datagram Protocol (WDP)

The **Wireless Datagram Protocol (WDP)** operates on top of many different bearer services capable of carrying data. At the T-SAP WDP offers a consistent datagram transport service independent of the underlying bearer. To offer this consistent service, the adaptation needed in the transport layer can differ depending on the services of the bearer. The closer the bearer service is to IP, the smaller the adaptation can be. If the bearer already offers IP services, UDP is used as WDP. WDP offers more or less the same services as UDP. WDP offers **source** and **destination port numbers** used for multiplexing and demultiplexing of data respectively. The service primitive to send a datagram is **TDUnitdata.req** with the **destination address (DA)**, **destination port (DP)**, **Source address (SA)**, **source port (SP)**, and **user data (UD)** as mandatory parameters (see Figure 10.11). Destination and source address are unique addresses for the receiver and sender of the user data. These could be MSISDNs (i.e., a telephone number), IP addresses, or any other unique identifiers. The **T-DUnitdata.ind** service primitive indicates the reception of data. Here destination address and port are only optional parameters.

If a higher layer requests a service the WDP cannot fulfill, this error is indicated with the **T-DError.ind** service primitive as shown in Figure 10.11. An **error code (EC)** is returned indicating the reason for the error to the higher layer. WDP is not allowed to use this primitive to indicate problems with the bearer service. It is only allowed to use the primitive to indicate local problems, such as a user data size that is too large. If any errors happen when WDP datagram's are sent from one WDP entity to another (e.g. the destination is unreachable, no application is listening to the specified destination port etc.), the **wireless control message protocol (WCMP)** provides error handling mechanisms for WDP and should therefore be implemented. WCMP contains control messages that resemble the internet control message protocol messages and can also be used for diagnostic and informational purposes.

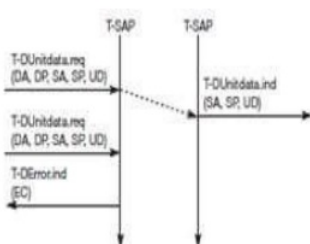


Fig 4.3 WAP Service Primitives

WCMP can be used by WDP nodes and gateways to report errors. However, WCMP error messages must not be sent as response to WCMP error messages. In IP-based networks, ICMP will be used as WCMP (e.g., CDPD, GPRS). Typical WCMP messages are **destination unreachable** (route, port, address unreachable), **parameter problem** (errors in the packet header), **message too big**, **reassembly failure**, or **echo**

**request/reply.** An additional

**WDP management entity** supports WDP and provides information about changes in the environment, which may influence the correct operation of WDP. Important information is the current configuration of the device, currently available bearer services, processing and memory resources etc. Design and implementation of this management component is considered vendor-specific and is outside the scope of WAP.

If the bearer already offers IP transmission, WDP (i.e., UDP in this case) relies on the segmentation (called fragmentation in the IP context) and reassembly capabilities of the IP layer as specified in (Postal, 1981a). Otherwise, WDP has to include these capabilities, which is, e.g., necessary for the GSM SMS. The WAP specification provides many more adaptations to almost all bearer services currently available or planned for the future (WAP Forum, 2000q), (WAP Forum, 2000b).

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