

# Efficiency of Efficient Mail Submission and Delivery (EMSD)

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General

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# Points of This Presentation

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- Existing Messaging protocols are not efficient enough for wireless applications
- Efficient Mail Submission and Delivery Protocols adequately address the efficiency problem

# Typical SMTP PDU Traces

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IP_PDU	MailServer	UA	DATA	TCP	IP	subtotal
1	TCP .<----- TCP SYN ----- .	0	24	44		
2	TCP . ----- TCP SYN ack ----->.	0	24	44		
3	TCP .<----- Push ACK ----- .	0	20	40	(128)	
4	SMTP . ----220 server ready ---->.	116	136	156		
5	TCP .<----- Push ACK ----- .	0	20	40	(196)	
6	SMTP .<----- HELO <client>---- .	36	56	76		
7	SMTP . ----250 server Hello ---->.	111	131	151		
8	TCP .<----- Push ACK ----- .	0	20	40	(267)	
9	SMTP .<--MAIL FROM:<sender> --- .	32	52	72		
10	SMTP . ----250 ... Sender ok---->.	39	59	79		
11	TCP .<----- Push ACK ----- .	0	20	40	(191)	
12	SMTP .<--RCPT TO:<rcpt>----- .	33	53	73		
13	SMTP .<----250...Recipient ok-- .	45	65	85		
14	TCP .<----- Push ACK ----- .	0	20	40	(198)	

# SMTP PDU Trace (cont'd)

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IP_PDU	MailServer	UA	DATA	TCP	IP	subtotal
15	SMTP	.<----- "DATA" ----- .	6	26	46	
16	TCP	. ----- ACK ----->.	0	20	40	(86)
17	SMTP	. ----354..end with "."---->.	50	70	90	
18	TCP	.<----- Push ACK ----- .	0	20	40	(130)
19	SMTP	.<--Mail header+body ----- .	437	457	477	
20	SMTP	.<----- . ----- .	5	25	45	
21	TCP	. ----- ACK ----->.	0	20	40	(562)
22	SMTP	. ----- 250 Ok ----->.	8	28	48	
23	TCP	.<----- Push ACK ----- .	0	20	40	
24	TCP	.<----- Push Reset ----- .	0	20	40	(128)

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# Key Requirements for Mobile and Wireless Messaging

Efficiency

Efficiency

Efficiency

# Efficiency, Efficiency, Efficiency

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- Minimize number of bytes transferred
- Minimize number of transmissions
  - Fewer transmissions results into lower energy consumption & longer battery life
- Minimize user perceived response time
- Minimize Code Size
- Miniaturized Devices

# Typical EMSD PDU Traces

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## SUBMISSION

IP_PDU	MailServer	UA	DATA	UDP	IP
1	UDP	.<---Invoke header+body --- .	206	214	234
2	UDP	. -----Response ----->.	15	23	43
3	UDP	.<----- Ack ----- .	2	10	30

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## DELIVERY

IP_PDU	UA	MailServer	DATA	UDP	IP
1	UDP	.<---Invoke header+body --- .	299	307	327
2	UDP	. -----Response ----->.	2	10	30
3	UDP	.<----- Ack ----- .	2	10	30

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# EMSD & SMTP: Message Submission

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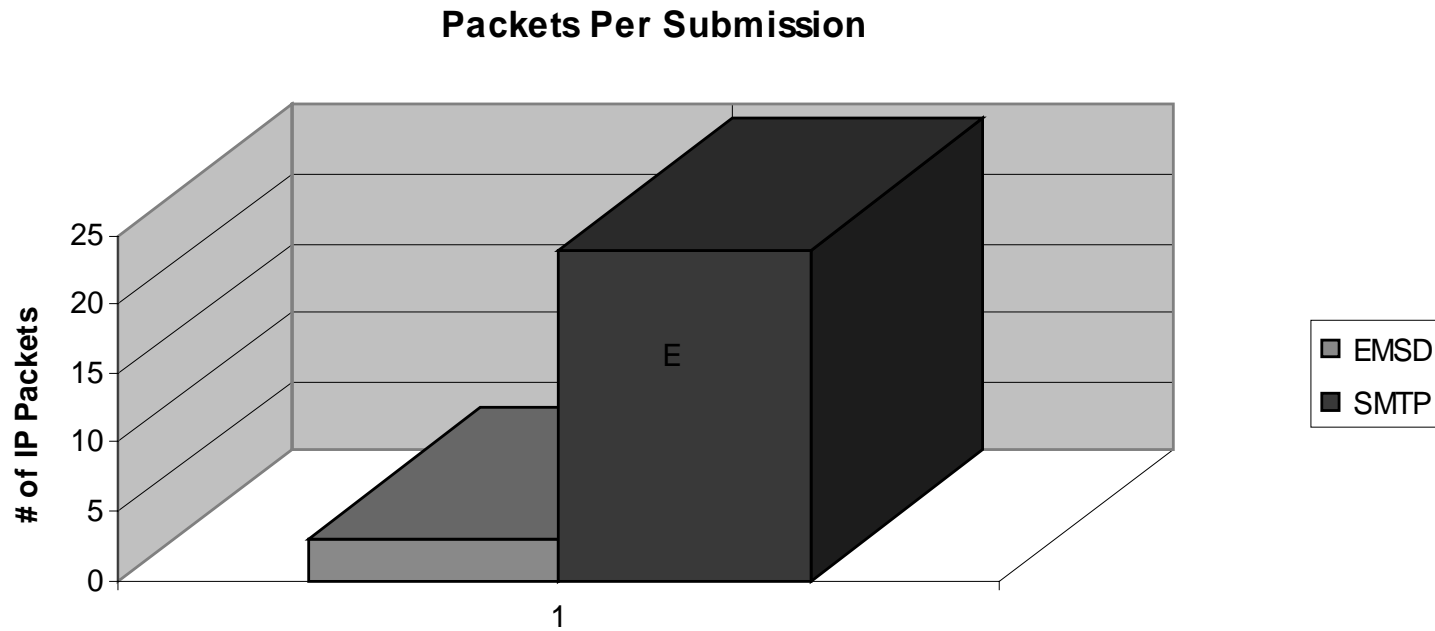
	EMSD	SMTP
Total number of IP packets	3	24
Total IP bytes	307	1886
Total MSG length (mail hdr+ mail body) (bytes)	206	437
Total overhead (bytes)	101	1449



# Submission: EMSD & SMTP

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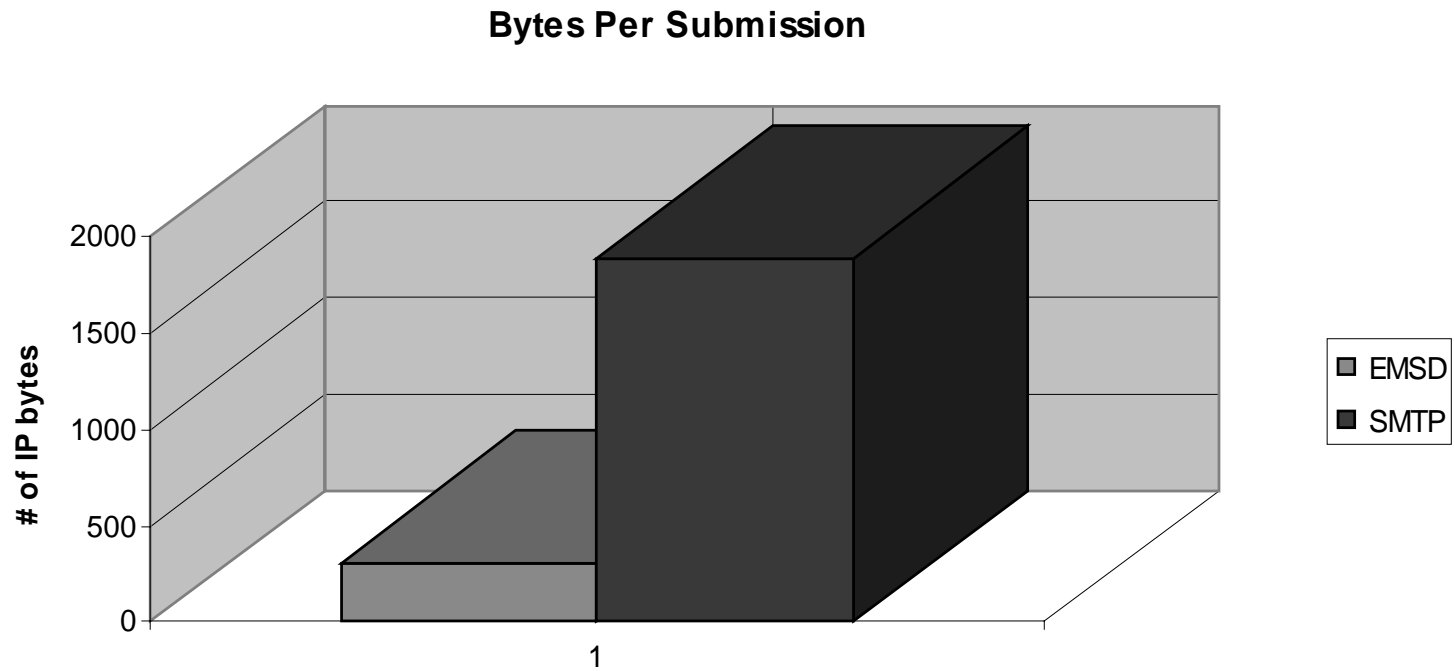
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# Submission: EMSD & SMTP

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# EMSD, SMTP, POP, IMAP - Message Delivery

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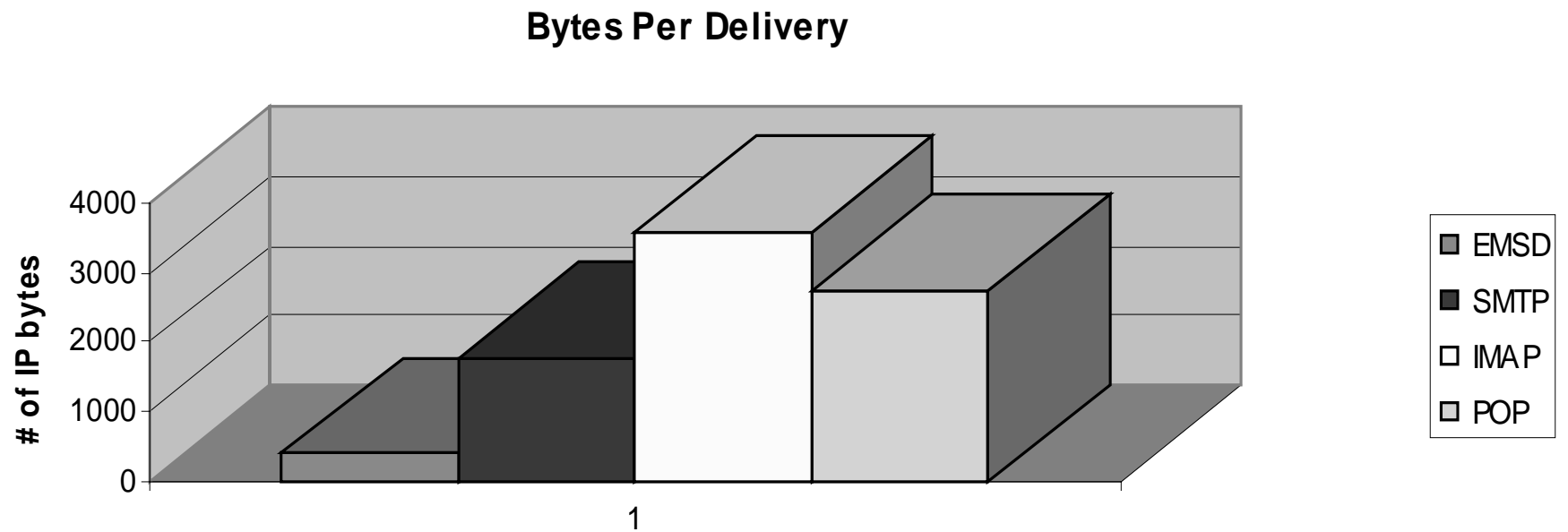
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	EMSD	SMTP	IMAP	POP
Total number of IP packets	3	24	36	34
Total IP bytes	387	1778	3593	2731
Total MSG length (mail hdr+ mail body) (bytes)	299	301	833	561
Total overhead (bytes)	88	1477	2760	2170

# Delivery: EMSD, SMTP, IMAP, POP

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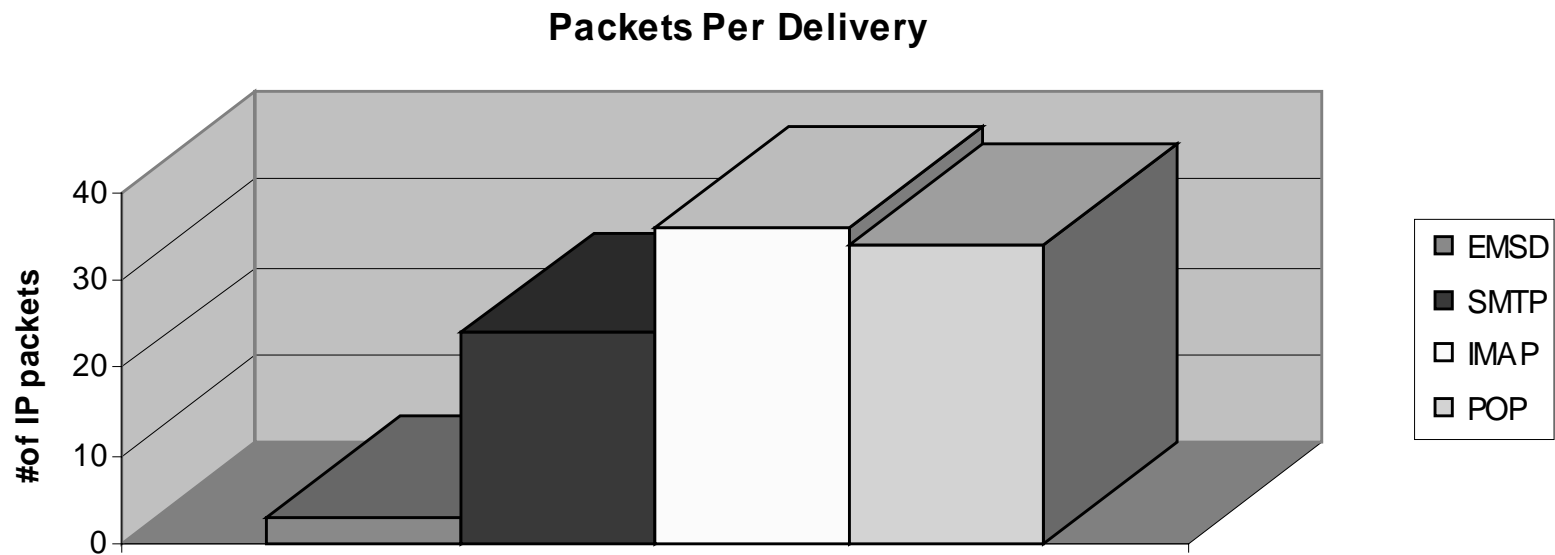
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# Delivery: EMSD, SMTP, IMAP, POP

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# Comparison of SMTP and EMSD Efficiency

	SMTP	SMTP+ Pipelining	QMTP, QMQP	EMSD
<b>client</b>	SYN	SYN	SYN	Submit Req
<b>server</b>	SYN ok	SYN ok	SYN	Submit Resp
<b>client</b>	HELO	HELO	message	ack
<b>server</b>	ok	PIPELINING	accept close	
<b>client</b>	MAIL	MAIL RCPT DATA	close	
<b>server</b>	ok	ok		
<b>client</b>	RCPT	message QUIT		
<b>server</b>	ok	accept ok close		
<b>client</b>	DATA	close		
<b>server</b>	ok			
<b>client</b>	message			
<b>server</b>	accept			
<b>client</b>	QUIT			
<b>server</b>	ok close			
<b>client</b>	close			