Open AT® TCP/IP and Internet Protocol Plug-Ins - Introduction

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Agenda

➔ What is IP Networking?

➔ Wavecom Strategy toward IP Networking

➔ Wavecom WIP Presentation

➔ Wireless CPU Compatibility Table

➔ Availability dates

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What is IP Networking?

➔ What is the easiest, most cost effective, commonly used and fully field proven technology to reach, manage, operate, monitor upload information from a huge number of remote machines on field?

➔ TCP / IP and associated protocols:
  – FTP,
  – HTTP,
  – PING…

Wavecom strategy toward IP Networking

➔ At Wavecom we believe these technologies will become the key drivers of the M2M / AVL / Meter Market.

➔ Indeed together with Open AT®, RTOS and DOTA feature, they provide a set of competitive features that perfectly fit with theses market-specific constraints:

– Always on / reachable / active for data upload / download device monitoring

– Very Long Life cycle: upgrade without recall campaign

– Simple architecture for cost optimization around Open AT®

– Good RTOS capabilities through Multitasking and minimal latency time even in GSM call or GPRS transfer.

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Wavecom strategy toward IP Networking

Wavecom actions:

➔ Technology:

  – Own the software code and the know how by having in house dedicated TCP / IP and Internet Protocols experts. Cf NexGen acquisition press Release:

    15/06/06 - Wavecom acquires NexGen Software, S.A.

  – Provide field proven technology: NexGen has sold more than 120 Millions copies of the stack since 1999

 – Issue a IP dedicated Roadmap to ensure the IP Networking features remain at a very competitive level

➔ Product:

  – Define state of the art Internet Protocol Plug-Ins in term of feature set, configurability, APIs, evolutivity…

  – Spread this new TCP/IP and Internet Plug-Ins across the latest Wavecom products.

➔ Manufacturing:

  – Provide Wireless CPU with embedded TCP/IP and Internet Protocol Plug-Ins.

Wavecom TCP/IP and Internet Protocol Plug-Ins Presentation
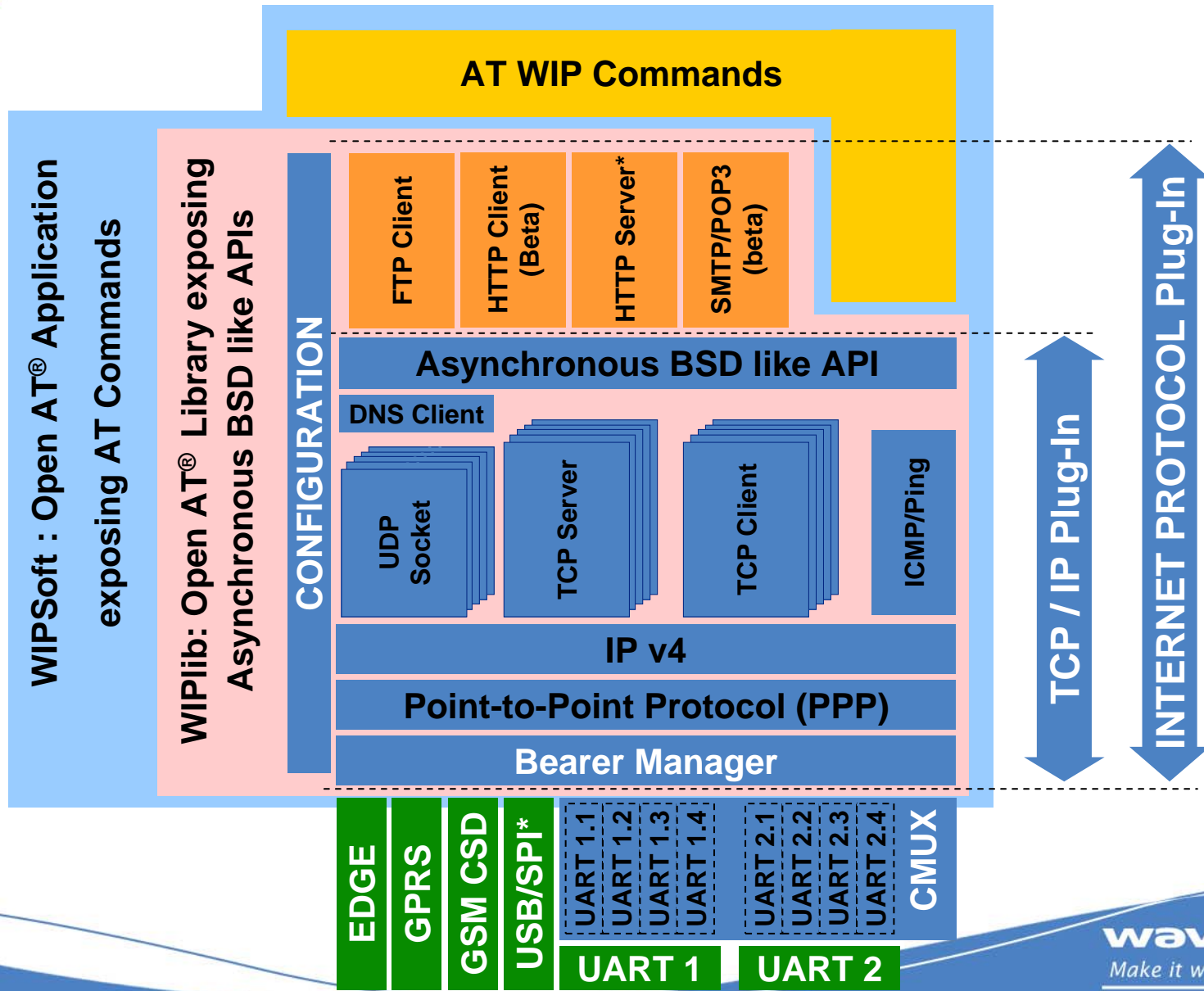
*not available at product introduction

Wavecom TCP/IP and Internet Protocol Plug-Ins Presentation - Main improvements

➔ Full RFC Compliance: listed in annex

➔ API improvements: as the API definition was led by:

  – AT Commands Compactness and standard definition,

  – Asynchronous BSD like for Open AT® APIs

  – TCP/IP oriented and bearer abstraction (no GSM / GPRS dependencies) for easy development and application porting.

  – Improved control and configurability of the stack through new APIs architecture definition and high granularity access to IP related functions

  – Futureproof: other IP based protocols will be implemented in the near future following the same "API philosophy".

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Wavecom TCP/IP and Internet Protocol Plug-Ins Presentation - Main improvements

➔ Asynchronous BSD - like Open AT® APIs

- clearly distinguishes the management of the bearer (GSM/GPRS) from the IP sockets management

- provides the user with the flexibility to configure and set IP-related parameters*.

- provides an interface to configure the maximum number of sockets that can be used by the customer application

- allows the customer application to manage the socket dynamically (Asynchronous BSD-like interface)

*For example, during configuration of the bearer using PPP protocol, the user can select different authentication mechanisms such as PAP, CHAP/MS_CHAP

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Wavecom TCP/IP and Internet Protocol Plug-Ins Presentation - Main improvements

➔ Multiple instance of same service can be run in parallel and can be multiplexed:

- In Open AT® APIs the number of UDP sockets, TCP Client, TCP server and FTP Session that can be run in parallel are only limited by the RAM available (380 bytes used per socket + configurable RAM buffer for data emission and reception).

- In AT Commands:

Protocol	Number of sockets/sessions
UDP socket	8
TCP client	8
TCP server	4
FTP session	1

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Wavecom TCP/IP and Internet Protocol Plug-Ins Presentation - Main improvements

➔ Customer Application Memory Usage Optimization:

– At linkage level: only the linked functions will be compiled in the final binary (optimized Flash usage).

– Modular architecture specifically defined to reduce the code size offset (optimized Flash usage).

– At runtime: Dynamic socket allocation: to optimize the RAM consumption:

- Socket needs only 380 bytes and some RAM buffer for data emission and reception: the size of these buffer can be configured.
- The maximum number of socket to be active at the same time (in Open AT®) is set at compilation but during program runtime, the socket can be dynamically activated.

➔ Efficient Error management:

– Through detailed feedback on the error case.

– AT Commands: through standard error response.

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Wavecom TCP/IP and Internet Protocol Plug-Ins Presentation - Main improvements

➔ Better configurability:

- Of the stack through dedicated initialization and termination APIs: TTL (Time to Live of IP datagram), TOS (Type of Service), IP fragment Time out…
- Per service configuration: each instance of each service (TCP client, TCP server, UDP socket, FTP session) can be configured independently.

➔ Bearer independence:

- The IP stack can run over: USB, UARTs (UART 1, UART 2, Virtual CMUX UARTs), GSM, GPRS, EDGE, ….
- Bearer concurrency support: each instance of each service (TCP client, TCP server, UDP socket, FTP session) can be running above any physical layer, several bearer being active at the same time.

➔ Improvement of the feature set with: HTTP Client.

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Wavecom Wireless CPU Compatibility table

SERIES	API	WIRELESS CPU	Wavecom TCP/IP & Internet Protocol Plug In
408 TCP/IP Plug-In	Open AT® APIs	New Q24 Series*	☑
		Q2501B/M1306B/ M2106B	☑
	AT Commands	New Q24 Series*	☑
		Q2501B/M1306B/ M2106B	☑
411: Internet Proto. Plug-In / 416: 411 + Bluetooth Plug In	Open AT® APIs	New Q24 Series*	☑
		Q2501B/M1306B/ M2106B	☑
	AT Commands	New Q24 Series*	☑
		Q2501B/M1306B/ M2106B	☑
	Open AT® APIs	Q2686/Q2687/WMP	☑

*New Q24 Series includes Q24 Classic, Plus, Extended and Auto

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ANNEX

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RFC Compliance List

➔ RFC 768 [Postel 1980] - User Datagram Protocol (UDP).

➔ RFC 791 [Postel 1981] - Internet Protocol (IP).

➔ RFC 792 [Postel 1981] - Internet Control Message Protocol (ICMP).

➔ RFC 793 [Postel 1981] -Transmission Control Protocol (TCP).

➔ RFC 1112 [Deering 1989] - Host Extensions for IP Multicasting.

➔ RFC 1122 [Braden 1989] - Requirements for Internet Hosts, Communication Layers.

➔ RFC 1123 [Braden 1989] - Requirements for Internet Hosts, Application and Support.

➔ RFC 2236 [Fenner 1997] - Internet Group Management Protocol, Version 2 (IGMPv2).

➔ RFC 2581 [Allman, Paxson, Stevens 1999] - TCP Congestion Control.

➔ RFC 3390 [Allman, Floyd, Partridge 2002] - Increasing TCP's Initial Window.