

WinArrow2 IP DSLAM market-specific silicon & software

WINPATH™ ACCESS PACKET PROCESSORS

Product Highlights

WinArrow2, Wintegra's state-of-the-art DSLAM processor, offers features targeted specifically at meeting the needs of high throughput IP DSLAMs.

- **Data Path (WinComm 2):**
 - 4 or 6 WinGines, 250 to 350 MHz
 - Application level backwards compatibility.
- **Control Path:**
 - MIPS 24Kc core, up to 600 MHz
 - MIPS core and WinComm may run at different frequencies
- **System Interface Functions:**
 - Support for DDR-I and DDR-II
 - ECC on all external and internal memories
- **Serial interface:**
 - Up to 4 Gigabit Ethernet Ports or 24 Fast Ethernet ports
 - 2 UTOPIA2/3 or POS2 or SPI.3 or EMPHY2
 - 2 Serial TDI
- **New hardware accelerators:**
 - Special Hardware for Shaping
 - Deep Classification and Content Searching
 - 0.13 Micron technology.
- Low power consumption
- 3.3V and 2.5/1.8V I/O, 1.2V internal
- 33 x 33 mm. package, 1020 balls, 1 mm. pitch
- WinArrow1 control path application code is compatible with WinArrow2, simplifying the transition to the new hardware.
- Field Proven Data Path Software for MSAN applications is TR 101 compliant providing future-proof scalability.
- Wintegra Linux Services offers a turnkey control path solution.

WinArrow2 overview

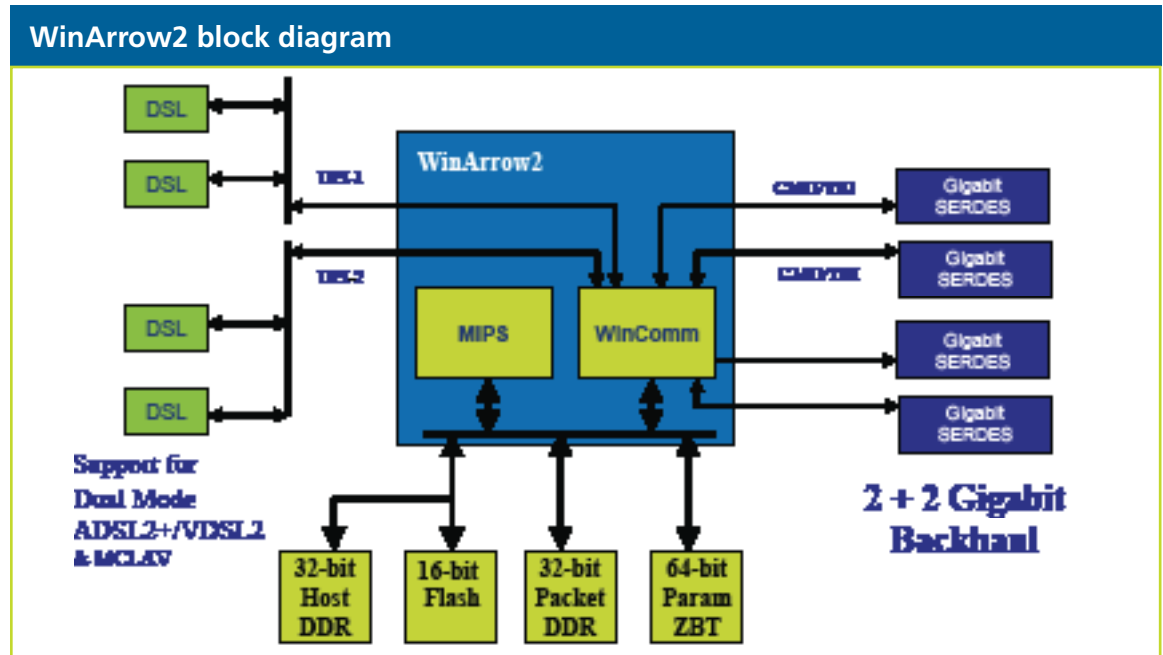
WinArrow2 is Wintegra's latest IP DSLAM-specific processor. It improves on the solid performance of the WinArrow1 by adding more WinGines, increasing memory and throughput capability, and utilizing a more powerful MIPS core.

It is specially designed with the access market in mind, so provides the high performance needed for IP Line Cards, yet consumes power efficiently.

This innovative device integrates both control and data path functionality on one chip, with separate dedicated processing elements for data and control. All data path features are ready to use (modifying code is not required), thereby accelerating development.

As a RAM-based processor, the WinArrow2 is highly flexible and, essentially, "future-proof," enabling easy





feature modifications and enhancements through regularly updated software upgrades.

Data Path Hardware

- **WinComm2:**
Six engine data path processing units
- **Bus Interfaces:**
 - Up to 64-bit Packet Bus (DDR, up to 200 MHz)
 - Up to 64-bit Parameter Bus (DDR or ZBT, up to 200 MHz)
 - Up to 64-bit Host Bus (DDR + System bus (PCI or 60x, up to 66/133Mhz)
- **Serial Interfaces:**
 - Dual UTOPIA2/3 or POS2 or SPI.3 or EMPHY2 Master/slave for DSL PHY interconnect
 - Supports 248 individual PHYs
 - UTOPIA/POS multi-PHY ports supports up to 100 Mbps (VDSL rates)
 - Mixed mode (ADSL/VDSL) support
 - Four Ethernet 10/100/1000 ports for back plane interface- redundancy & subtending support- or 24 fast Ethernet (10/100) ports
 - TDI clear channel port supporting host-terminated operation for code downloads and management.

Data path software:

Wintegra's rich, mature DSL software suite has the advantage of 5 years of ongoing development and continuing enhancements. WinArrow2 uses software derived from the field-tested DSLAM software used by the WinPath2 family. This derivative software is optimized for DSLAM customers; it offers the features and stability needed to deliver quick time to market.

The WinArrow2 is cost effective because its scalability makes it ready for the future. As the WinArrow family evolves, customers can easily transition to future silicon using existing software supplemented by new software releases.

Wintegra's advanced data path software suite for DSL applications is field-proven. All features may be used without modification. This decreases dependence on support and means less work for engineers, allowing for faster time to market. Some key data path features include:

- encapsulation and bridging,
- filtering,
- traffic shaping and management,
- multicast

TR-101 compliant software is now available. Ask Wintegra for a compliance statement.

Control Path Hardware

- Standard RISC processor:
 - Handles Data Path configuration & full control plane functionality
 - MIPS 24KC 64-bit Core
 - 16K I-cache and 16K D-cache
 - 32-bit Address /64-bit Data Bus
- General System Functions:
 - Eliminates the need for any glue logic
 - Timers, UART, I2C, EJTAG
 - Interrupt controller
- Bus Interfaces:
 - 64-bit Flash, DDR I or DDR II and peripheral-provides interface for host processor memory and peripherals (DSL PHYs)

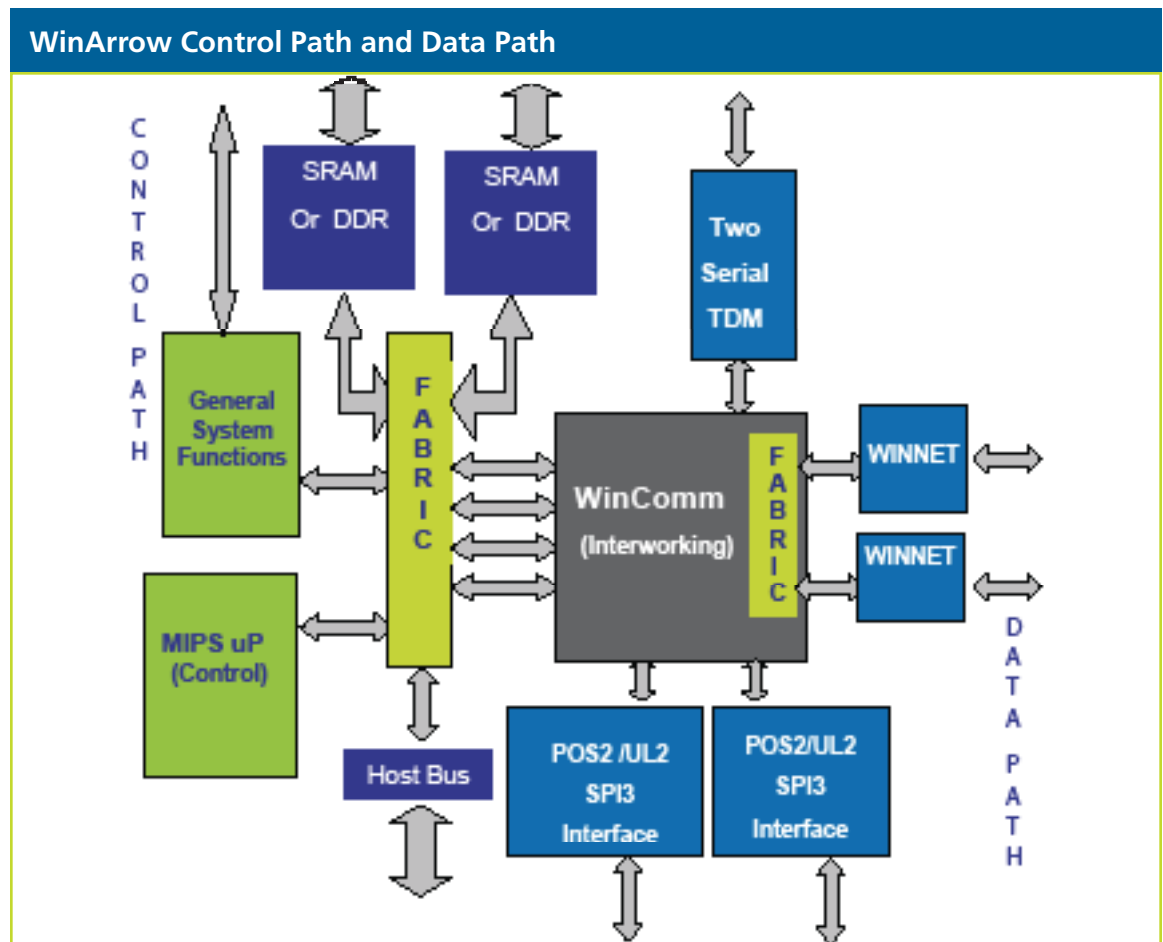
Control Path Software

- Wintegra Linux Services
- Support for standard OS
- BSP and Data Path Veneer available for VxWorks 6.3 and Linux

WLS

Wintegra’s Linux Services (WLS), an optional turn-key control path solution, is also provided. The WLS is a high-level, object-oriented software package that adds a layer on top of the WinPath Device Driver Interface (WDDI) in order to implement commonly used DSL control and data path protocols. WLS is designed as a DSLAM reference application based on the embedded Linux operating system. The system implements a VLAN aware bridge, ATM and Ethernet interfaces, and all relevant control stacks. It can be configured as a DSLAM uplink, a line card or as a mini-DSLAM application.

The WLS invokes WDDI API functions to activate the WinPath™ Data Path Software (DPS) to handle all data path packet processing, and includes an implementation of standard ADSL related control protocols like STP (Spanning Tree Protocol) and IGMP snooping. In addition, WLS includes a layer that creates relationships between WDDI objects and other management packages like a rich command line interface or a standard and proprietary SNMP MIBs.



WinArrow1 to WinArrow2 Comparison Table		
Features	WinArrow1	WinArrow2
Frequency	166 to 233 MHz	250 to 350 MHz
WinGines	4	4 or 6
Host Bus	SDRAM, up to 116 MHz	DDR + System Bus (PCI or 60x up to 66/133 MHz)
Parameter Bus	SDRAM, up to 155 MHz	DDR or ZBT, up to 200 MHz
Packet Bus	SDRAM, up to 155 MHz	DDR up to 200 MHz
GigE Ports	2	up to 4
Utopia/POS ports	x2 level 2, up to 124 PHYs	x2 level 3/SOI-3 up to 193 PHYs + TOD
MIPS core	MIPS 5KC, 200 MHz	MIPS 24KC, up to 600 MHz

When compared with WinArrow1, WinArrow2 offers greater performance by increasing the number of ports, adding more WinGines and a more powerful MIPS core, and using DDR/DDR2 RAM.

Built-in Interworking features

WinArrow2 interworking features (listed below) are built into the data path software and WDDI. They are a “part” of the chip, and require no licensing or royalty fees.

- ATM to IP Interworking
- Transparent or VLAN Aware Bridging between GbE, GbE and UTOPIA
- Filtering – Unlimited set of DFC Filtering options based on various port, session and L2, L3 and L4 header fields
- 4K Flows
- 4K VLANs (including optional VLAN Stacking)
- 1024 VCs (including per VC queuing or up to 8 priority queues per VC)
- Multicast and IGMP Snooping with 1024 Multicast Groups
- TM 4.1 Compliant UBR, VBR, GFR, CBR
- ATM OAM
- PPPoE
- PPPoA
- ATM Cell transport in Ethernet Frames
- Mixed mode (ADSL/VDSL) selectable per PHY
- ATM G.Bond
- Ethernet G.Bond (under development)

Customer “special needs” may be contracted through Wintegra’s engineering services team as a separate engineering services engagement.

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