



Gartner's PlanetStorage

**LTO Technology:
The True Measure of Tape**

June 11, 2002



THE TRUE MEASURE OF TAPE

Our Time Together ...

- A brief history of the LTO Program
- Ultrium format benefits
- ~~Tape wars~~ – Roadmap wars
- Market adoption dynamics
- User stories
- Questions and answers



THE TRUE MEASURE OF TAPE


Why LTO Technology Was Developed...

- To establish a new open format specification for high capacity, high performance tape storage products for midrange and network server environments
- To create a new benchmark for data integrity and reliability
- To define a credible technology roadmap with long range growth capabilities
- To provide users with superior format options and multiple vendor product alternatives
- To meet diverse user and tape application needs



THE TRUE MEASURE OF TAPE

Four-generation roadmap ...

	Generation 1	Generation 2	Generation 3	Generation 4
Capacity Native Compressed	100GB 200GB	200GB 400GB	400GB 800GB	800GB 1.6TB
Data Rate Native Compressed	10-20 MB/s 20-40 MB/s	20-40 MB/s 40-80 MB/s	40-80 MB/s 80-160 MB/s	80-160 MB/s 160-320 MB/s
Media	Metal Particle	Metal Particle	Metal Particle	Thin Film



WHAT IS THE TRUE MEASURE OF TAPE ?

- Open format development and support
- Supply chain assurances
- Matches features and requirements
- A roadmap you can count on
- Widely adopted and supported



THE TRUE MEASURE OF TAPE

- Only true 100 GB+ open tape format
 - Open format defined
 - No entry barriers to any company willing to acquire a technology license
 - Input from licensee base on technology development
 - Compatibility between various manufacturers' products
 - Technological independence between manufacturers' products
 - Differentiation of products based on feature sets



THE TRUE MEASURE OF TAPE

No entry barriers – 30 industry leading licensees

- Accutronics Inc.
- ADIC
- Advanced Research Corp.
- Alps Electric Co. LTD
- Benchmark Tape Systems Corp.
- eMag Solutions
- EMTEC Magnetics GmbH
- Exabyte Corp.
- Fuji Photo Film Company Ltd.
- Fujitsu Ltd./FCPA Intellistor
- Hewlett-Packard Co.
- Hi/n
- IBM Corp.
- Imation Corp.
- M4 Data Ltd.
- Matsushita Electric Industry (MEI)
- Maxell
- Mitsumi Electric Co. Ltd.
- Mountain Engineering II Inc.
- NEC Corp.
- Ontrack Data Intl.
- Otari Inc.
- Overland Data, Inc.
- Phillips Semiconductor Gratkorn GmbH
- Plasmon IDE Inc.
- Quantegy Inc.
- Seagate Removable Storage Solutions
- Sony Corp.
- Tandberg Data
- TDK Corp.
- Verbatim Corp.



THE TRUE MEASURE OF TAPE

- Licensee input on technology development
 - Benefit of LTO manufacturer's group meetings
 - Brings together the best development minds
 - Enhances the quality of the format
- Compatibility between various manufacturers' products
 - Tested by an independent laboratory
 - Public assurance with the Ultrium trademark
 - Ultrium media = interchange



THE TRUE MEASURE OF TAPE

- Technological independence
 - Lowers risk through multiple sourcing capabilities
 - Supply chain assurance
- Differentiation of products based on feature sets
 - Choice of features to suit requirement
 - Data interchange unaffected
 - Differentiating tape drive features include
 - Speed
 - Form factor
 - Interface
 - Product unique features



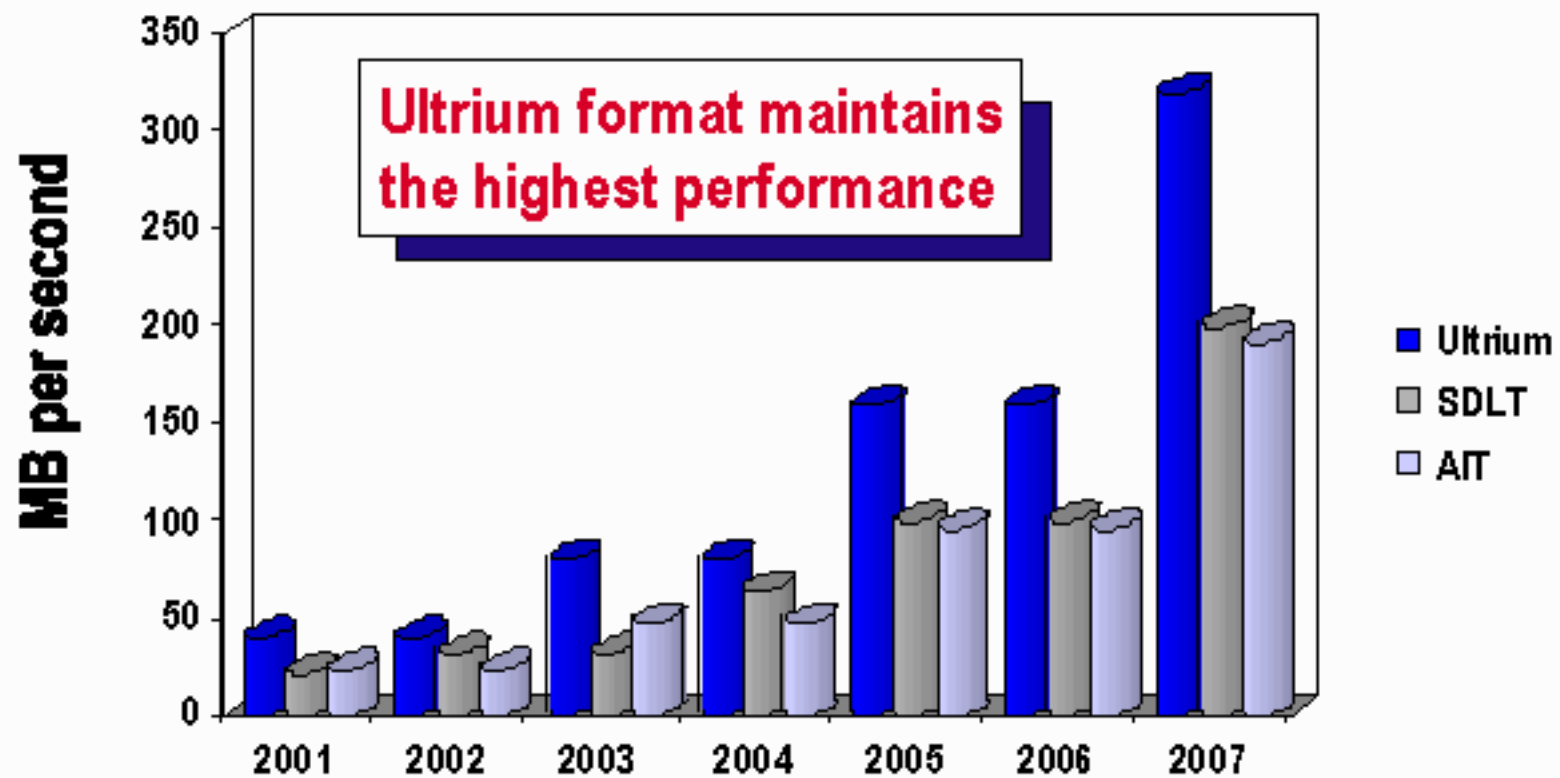
THE TALE OF THREE ROADMAPS

- Ultrium roadmap – market defined
- Raw capacity is not the only measure
- Automation density is 10% higher than SDLT
- Raw transfer rate is critical for backup and restore
- Time to backup is critical for shrinking backup window



THE TALE OF THREE ROADMAPS

Format Transfer Rate: Faster is Better

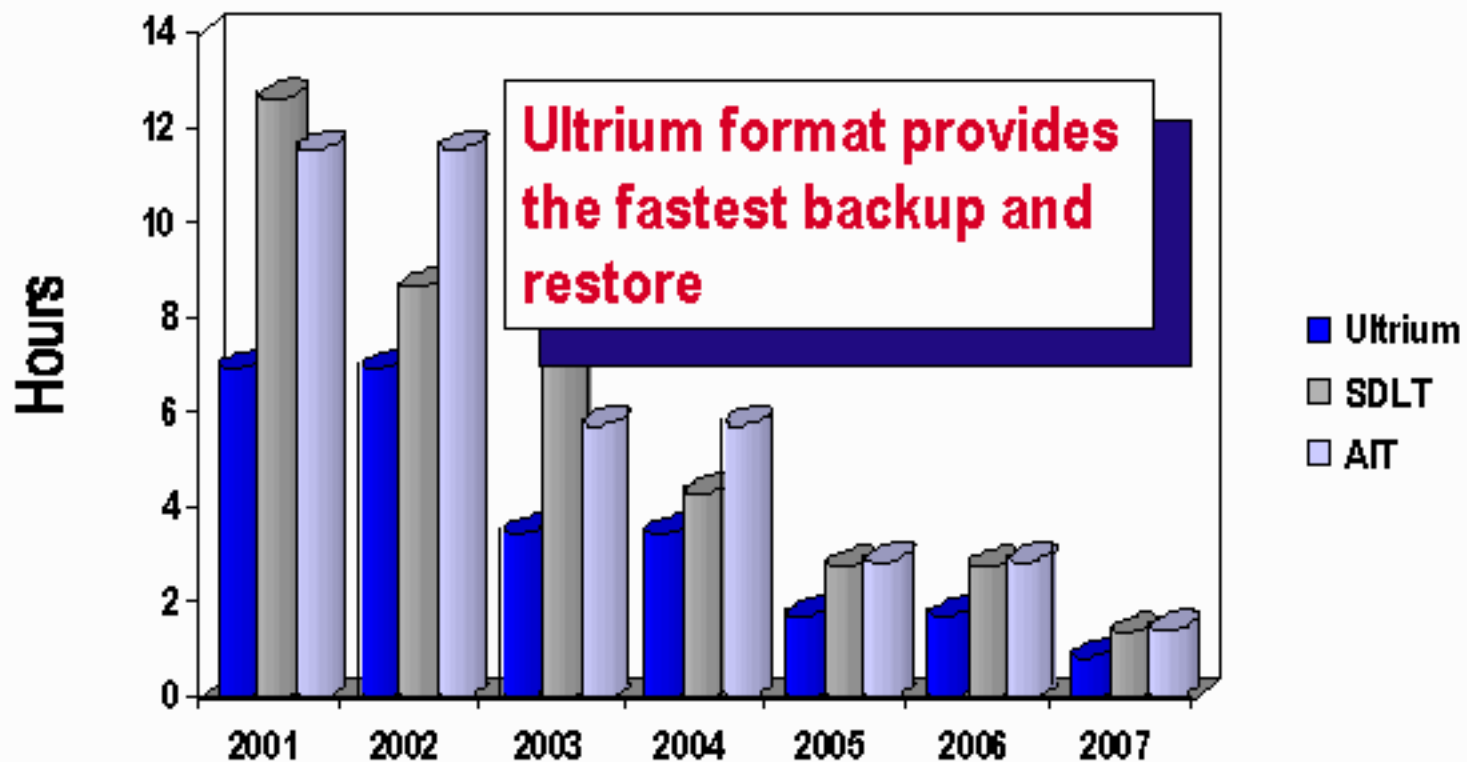


Source: Published Internet documents



THE TALE OF THREE ROADMAPS

Time To Backup 1 Terabyte: Shorter is Better

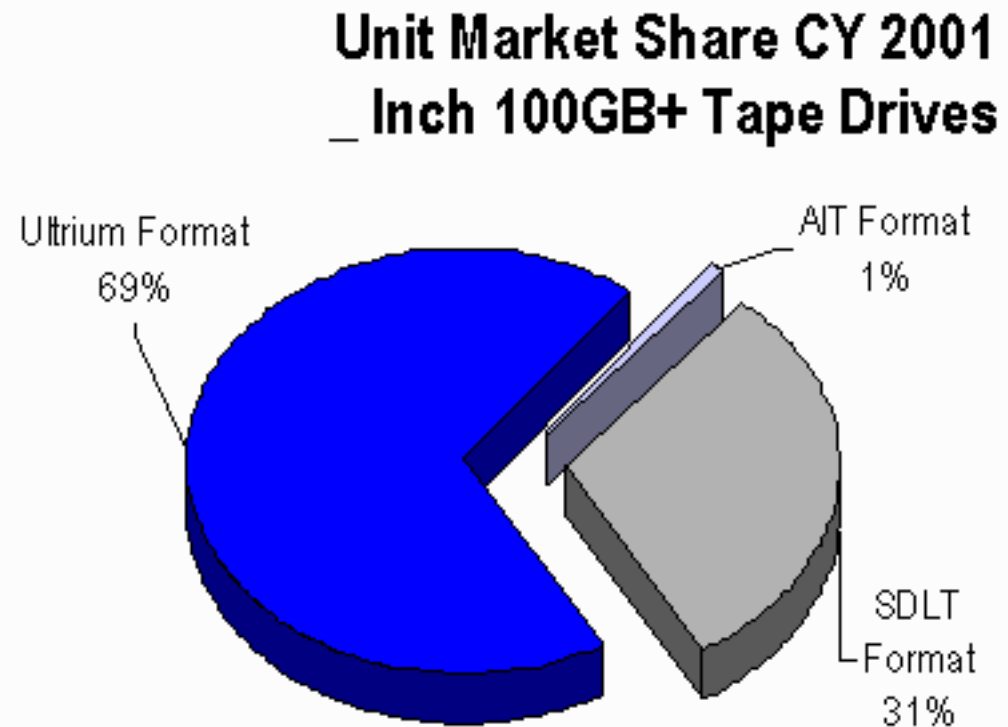


Source: Published Internet documents



MARKET MEASUREMENTS OF SUCCESS

- Market Adoption
 - Indicates format acceptance
 - Indicates product acceptance
 - Can act as a predictor
- CY 2001 Results
 - Ultrium format has clear advantage

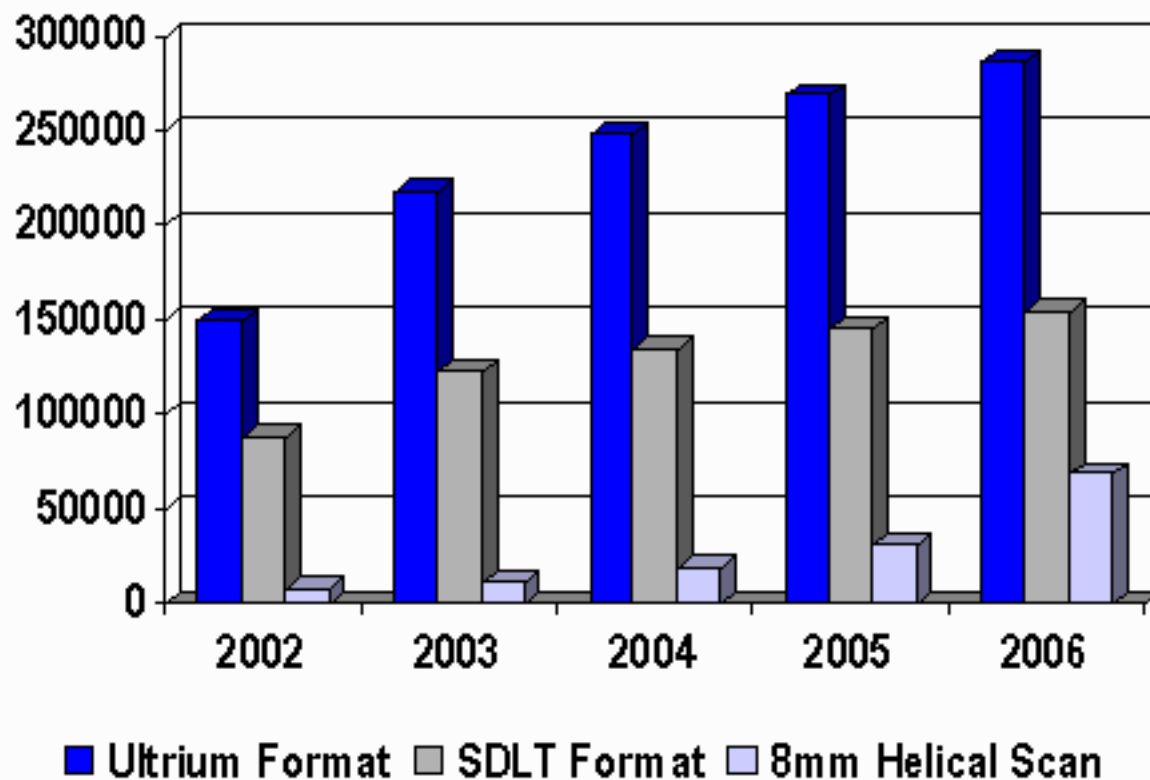


Source: Gartner Dataquest 3/2002



MARKET MEASUREMENTS OF SUCCESS

Forecast Unit Shipments of 100 GB+ Tape Drives



Source: Gartner Dataquest 4/2002



MARKET MEASUREMENTS OF SUCCESS

- Customer support
 - Critical for solution availability
 - Critical for serviceability
- Supporting automation manufacturers
 - Quantum|ATL, ADIC, Overland Data, Qualstar, MaxOptix, Exabyte, Plasmon, HP, IBM, StorageTek
- Supporting system OEMs
 - Dell, HP, IBM, Sun



CUSTOMER CHOICES

- Customer: *Worldwide Formula One, Grand Prix Racing Company*
- Situation: *Company faced the problem of increasing data storage requirements, increasing R&D information as well as business critical application data. Also a primary concern was their shrinking backup window.*
- Format Considerations: *Speed, reliability, open-format. Lower media costs driven by a competitive, open environment were attractive.*
- Resolution: *Ultrium format based library system.*
- Results: *Critical business data protected 3-times faster. More comprehensive backups. Room to grow.*



CUSTOMER CHOICES

- Customer: Electronics Research, Development and Service Provider
- Situation: Significant data growth in a heterogeneous environment (NT, Sun and HPUX); back up to direct attach tape solutions.
- Goal: Create an enterprise-class data recovery system to support its rapidly growing service and SAP implementation.
- Format Considerations: Capacity, roadmap viability, reliability, performance.
- Resolution: Ultrium format based library connected via SAN offering the scalability required.
- Results: Met the goal of creating an enterprise-class data recovery system to support the multiplatform server environment and rapidly growing applications.



WHAT IS THE TRUE MEASURE OF TAPE ?

- Open format development and support
 - Only the Ultrium format provides collaborative technical development
- Supply chain assurances
 - Only Ultrium provides true technologically independent supply chains
- Matches features and requirements
 - Only Ultrium allows you to choose the drive features that best suit your needs



WHAT IS THE TRUE MEASURE OF TAPE ?

- A Roadmap you can count on
 - Ultrium is based on evolutionary technology you can count on
 - Transfer rates keeping up with requirements
- Widely adopted and supported
 - Globally distributed
 - Virtually every OEM and automation manufacturer, distributor and integrator provides Ultrium format products





WHAT IS THE TRUE MEASURE OF TAPE ?

