



Intelligent Broadband Networks

PWC Recognizing/Screening Technology Opportunities

May 16, 2008



Agenda

- History
 - PixStream
- Sandvine Opportunity Hunt
- Broadband Phenomena
- Engineering a Culture

History: The PixStream Story

- Founded in 1996 by three entrepreneurs
 - During 1997 secured a contract and hired 4 engineers
- Dec 1997 Venture capital funding - University Reunion
- Sept 1998 secure first telco customer
- July 1999 spun out non-core backplane division
 - Sold to Rital Germany \$30M
- August 2000 announce sale to Cisco for \$550M - Deal closes Dec 2000
- April 2001 Cisco announces closure
- August 2001 Cisco's shuts down Video Networking BU



PixStream Revenue and Headcount

Year	Revenue	Headcount
1996	-	4
1997	-	7
1998	\$0.4M	35
1999	\$7.3M	91
2000	\$12.0M	200
2001*	\$25.0M	220

*pro forma

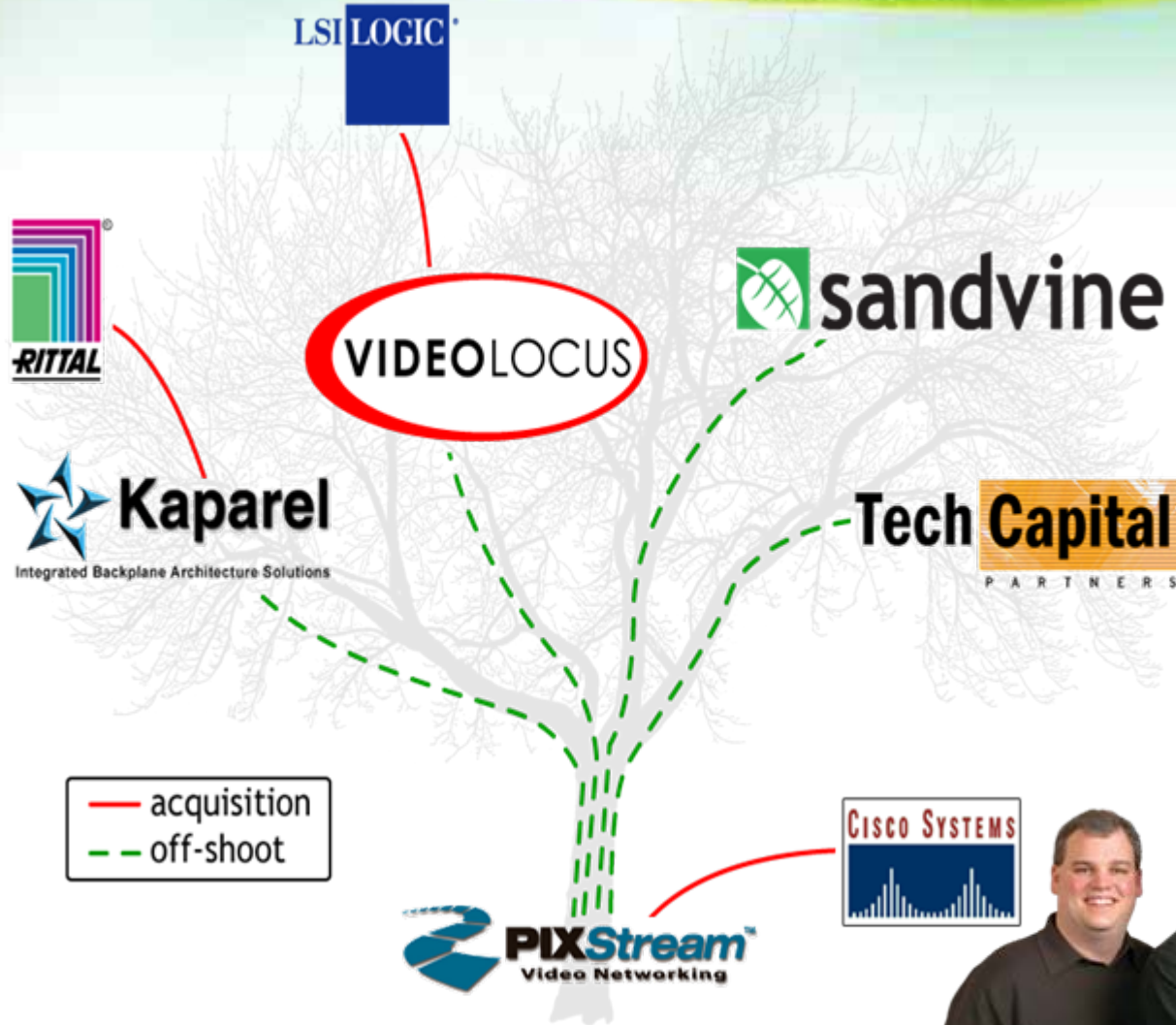


Financing rounds - pre-money values

➤	Venture Capital	Share Price
✓	Dec 1997 - \$6M (raised \$3M)	\$.50
✓	Mar 1999 - \$22M (raised \$7M)	\$.75
✓	Nov 1999 - \$65M (raised \$12M)	\$1.80
➤	Special warrants	
✓	Feb 2000 - \$200M (raised \$35M)	\$8.00
➤	Sale	
✓	Aug 2000 - \$550M	\$16.00



The PixStream Legacy



Sandvine's Story

- August 30th Cisco closes Video Networking Business Unit
- August 31st Sandvine Founded



Sandvine's Dilemma

- Pure talent available
- Needed money to hire talent
- Were employed by Cisco the previous day
 - Employment Contract Issues: Non Competes, Invention Agreements, Non Disclosure Agreements, Confidentiality Agreements
 - Not allowed to have any ideas
- Needed to find a new new opportunity FAST!

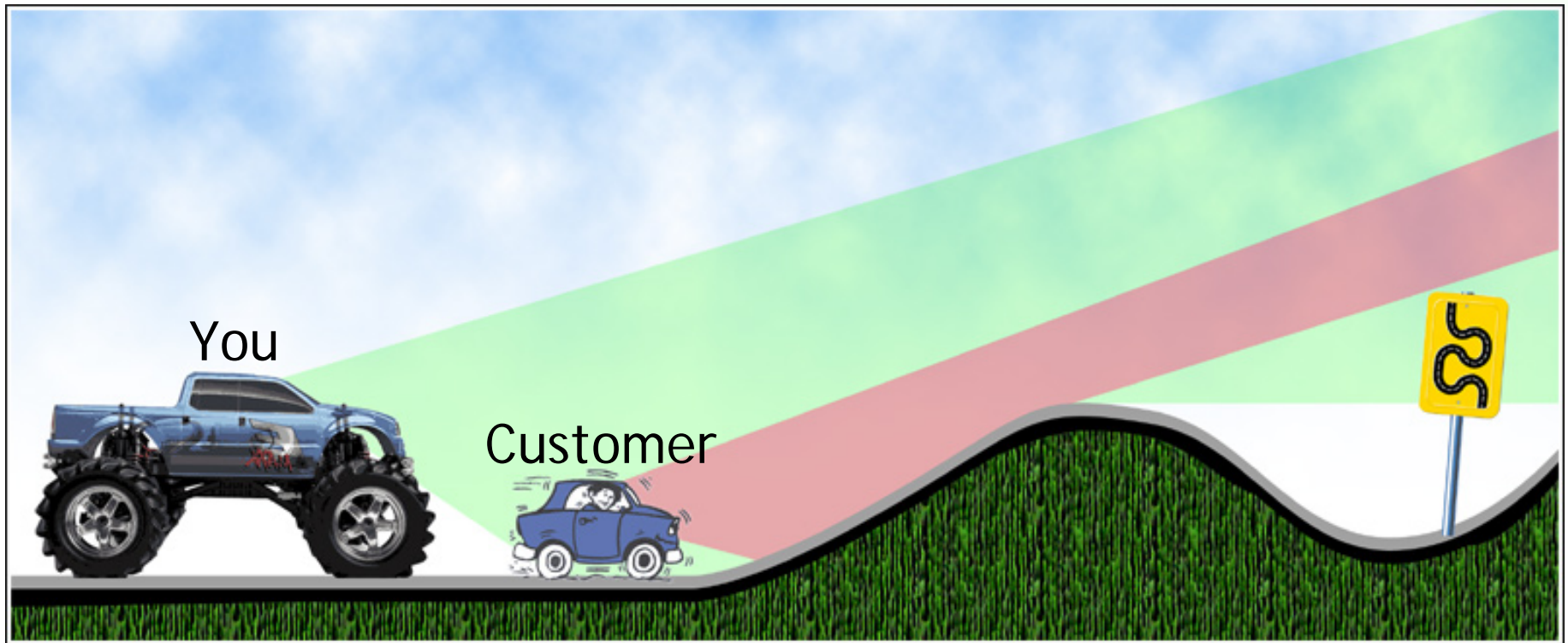
Sandvine's Process

- Think in terms of absolute truths
 - Internet is going to continue to grow...
- Four teams with four strong leaders
 - SANs - Storage Area Networks
 - VoIP - Voice over IP
 - FTTH - Fibre to the home
 - iVAS - Internet Value Added Services

Process Con't

- Report back to everyone every 2-3 days
 - Visit customers
 - Buy market research
 - Interview experts (SEs, Analysts, Friends)
 - Analyse Potential Competitors
 - Patent Searches
- Develop an imaginative understanding of marketplace and customers needs and wants

Understand Customer & Marketplace



Screening

➤ SANs

- ✓ 80% of enterprise IT spending was going to be on Storage!
- ✗ Cost of each storage element quickly became the hard drives
- ✗ No expertise
- ✗ No Passion

➤ VoIP

- ✓ Huge market
- ✓ Many problems to solve
- ✗ Many funded start-ups
- ✗ Cisco & Nortel committed to it being strategic and investing ~\$2B

Screening

➤ FTTH

- ✓ Huge market
- ✓ Convinced it is going to happen
- ✓ Existing Start-ups started too early
- ✗ Cable already built out
- ✗ Convinced it won't happen inside our window

➤ iVAS

- ✓ Great Analogy
- ✓ Very difficult
- ✓ End customer willingness
- ✓ New chips available at the right time
- ✓ Core competency
- Market timing??
- Continued telecom turmoil??

Characterize and Control Broadband Traffic

Increase Network Profitability

Ensure Subscriber Satisfaction

Mitigate SPAM

Enforce Acceptable Use Policies



Understand Traffic Trends

Stop Worm/DoS Traffic

Manage P2P File Sharing

Sandvine builds networking equipment that helps broadband service providers reduce network costs while enhancing the Internet experience for their subscribers.

Intelligent Broadband Networks

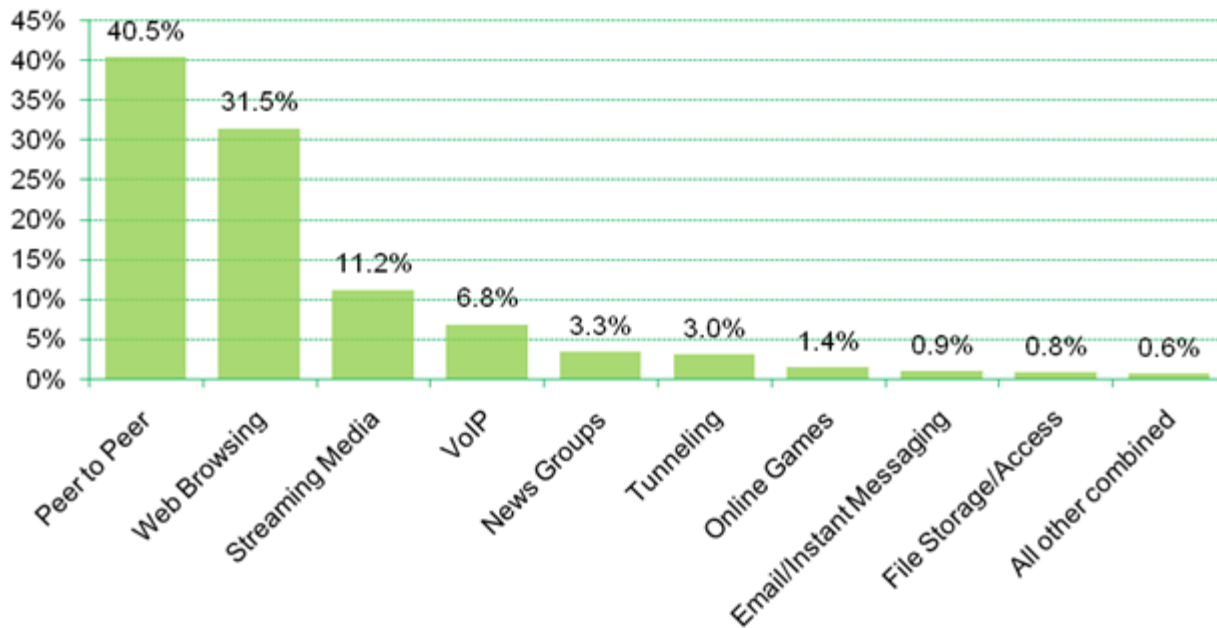
For Broadband and Mobile Data Service Providers



- Inspect traffic
- Enable and enforce policy

Internet Traffic Snapshot

Application Ranking by B/W

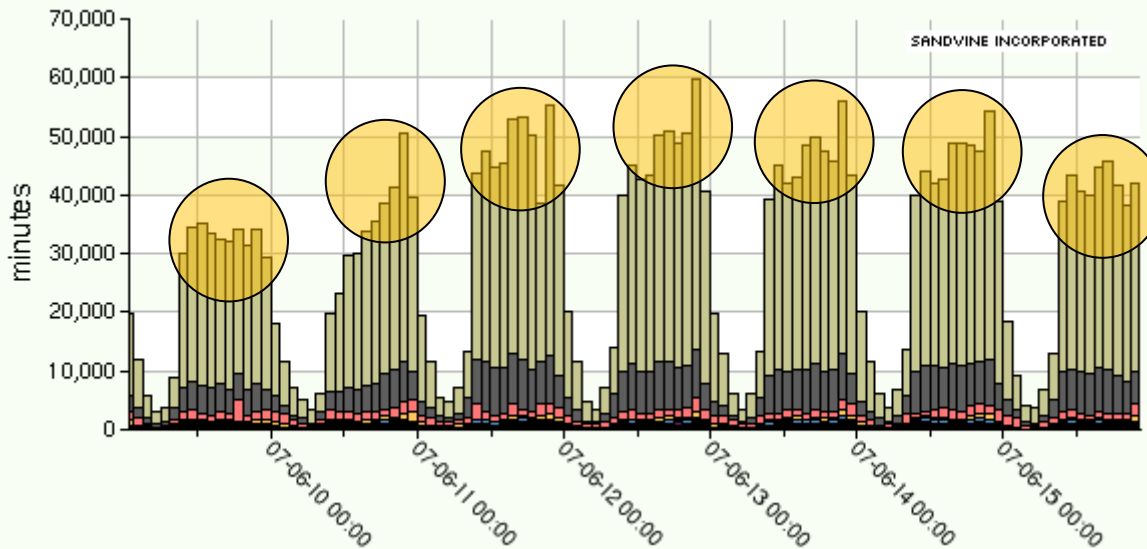


Major Take-Aways

- P2P still dominates, more and more **content-rich applications** emerging and straining network capacity. Growth leader - **streaming media**.
- Sandvine solutions: A **suite of applications** to deal with varying demands of each application, subscriber.

Extended VOIP Usage

VoIP Minutes for 1 Week



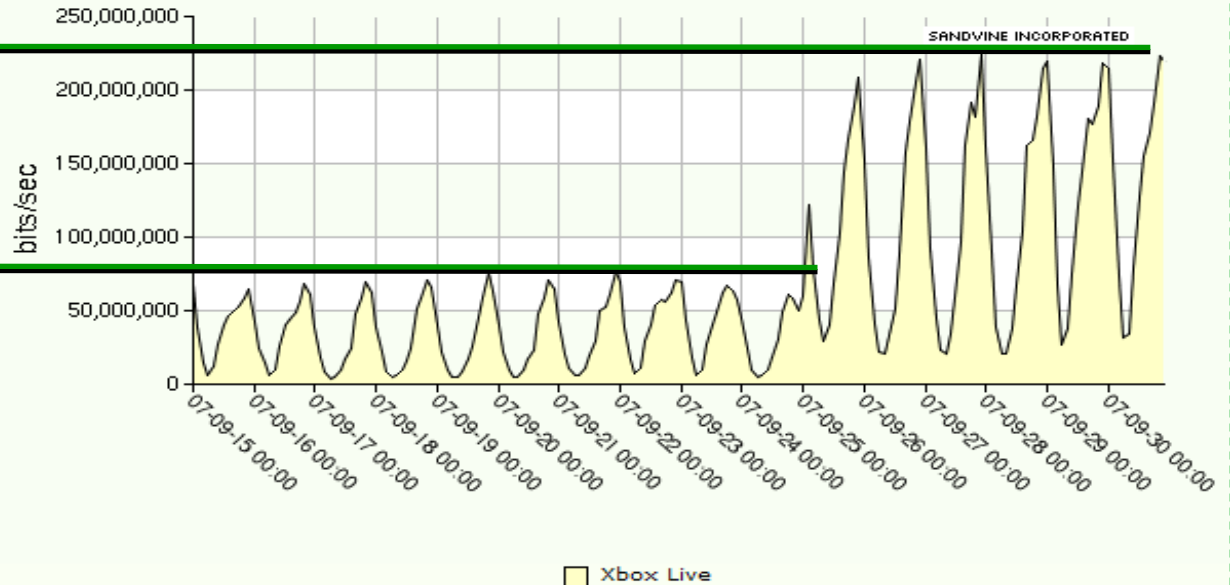
Key Take-Aways

- **Latency and jitter sensitive**, significant usage during business hours until midnight, longer time of peak than last year.
- Sandvine solutions: New service tier with guaranteed **QoS for VOIP**, call **Mean Opinion Scores** for customer service



Online Gaming Surges

Impact of Halo 3 on Xbox live B/W

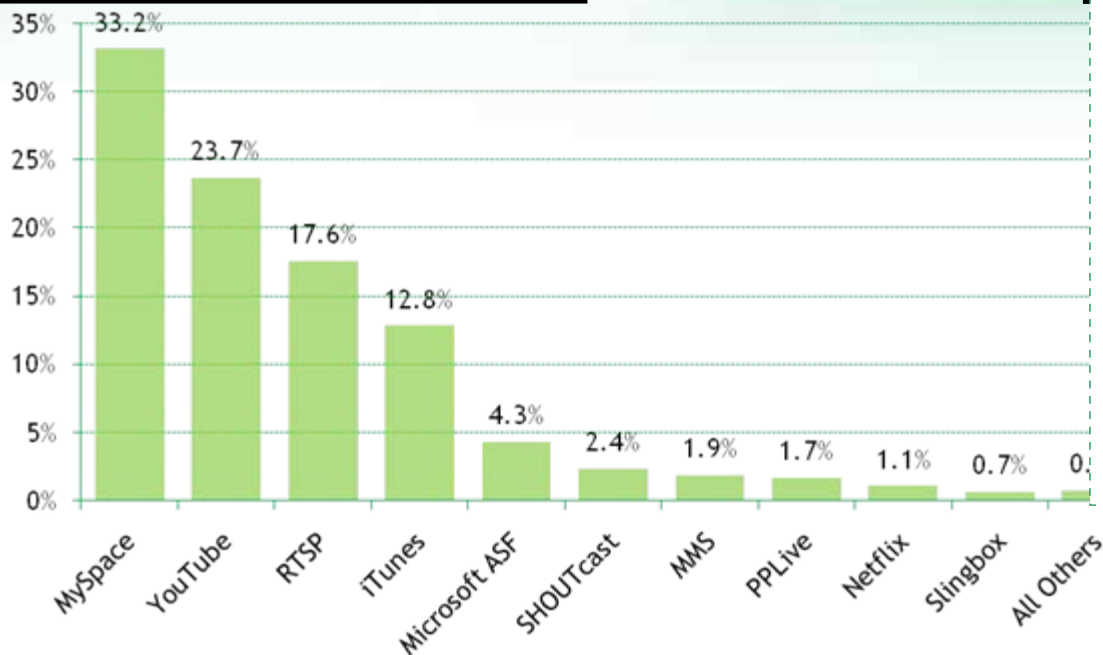


Key Take-Aways

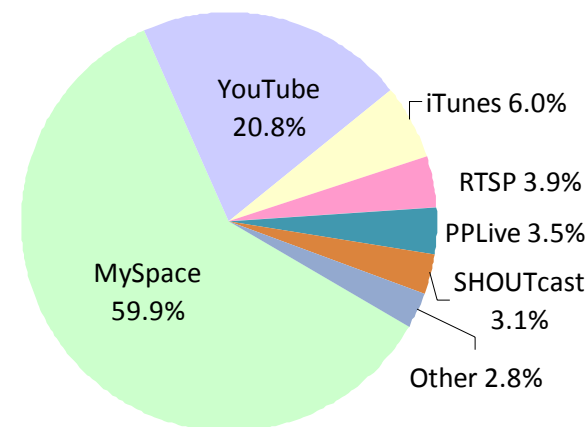
- Latency and jitter sensitive. **Peak Xbox live Bandwidth** has surged to new level after release of Halo 3. **Gaming happening at all hours of the day/night**; continuously during weekdays and weekends.
- Sandvine solutions: A new service tier with **guaranteed QoS for online gaming**

Digital Media Growing Fast

Streaming Media Bandwidth Ranking



Streaming Media Hosts

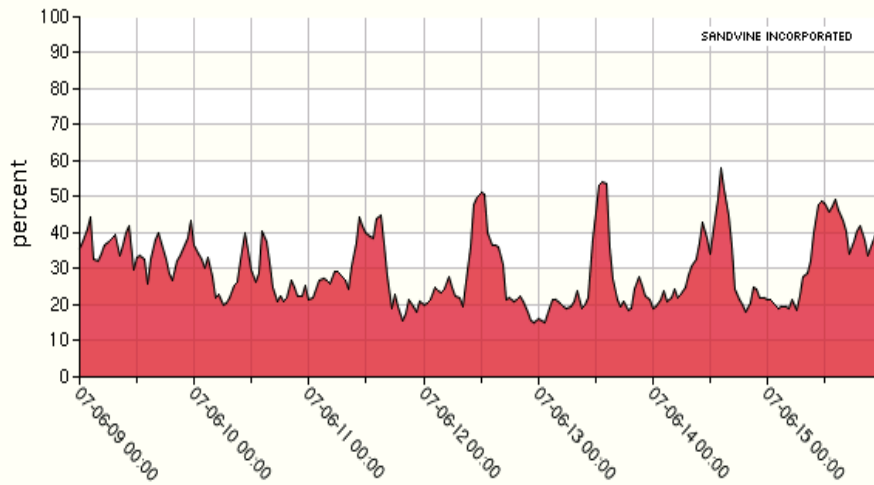


Key Take-Aways

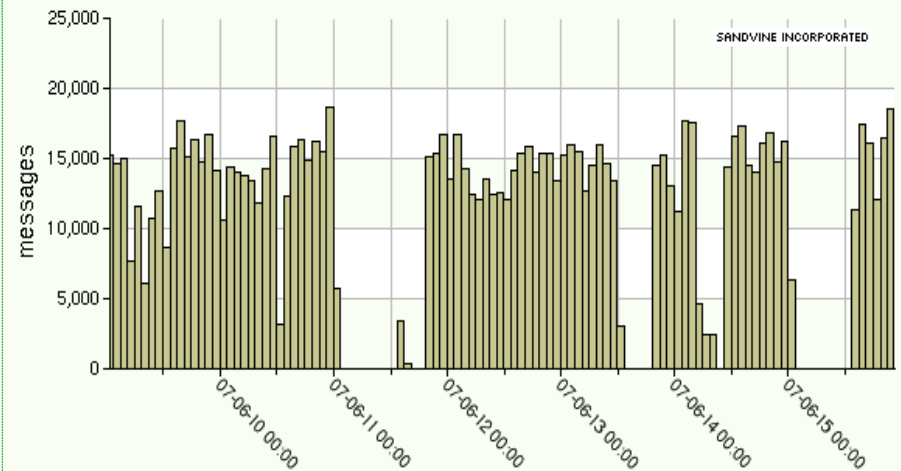
- **Bandwidth-intensive, latency and jitter sensitive.** Top 5 protocols collectively consume ~92% of total streaming media bandwidth. **MySpace & YouTube** are most popular, either in bandwidth or in online hosts.
- Sandvine solutions: **Intelligent Traffic Management** to tailor video streaming bandwidth per subscriber per session, new service tier with **guaranteed QoS for streaming media**

Spamming is Constantly Active

% of Outbound Email that is Spam



A typical Spammer Sending Spam



Top 100 Spammers' Impact

Average per Spammer per day

Spamming **5 hours**

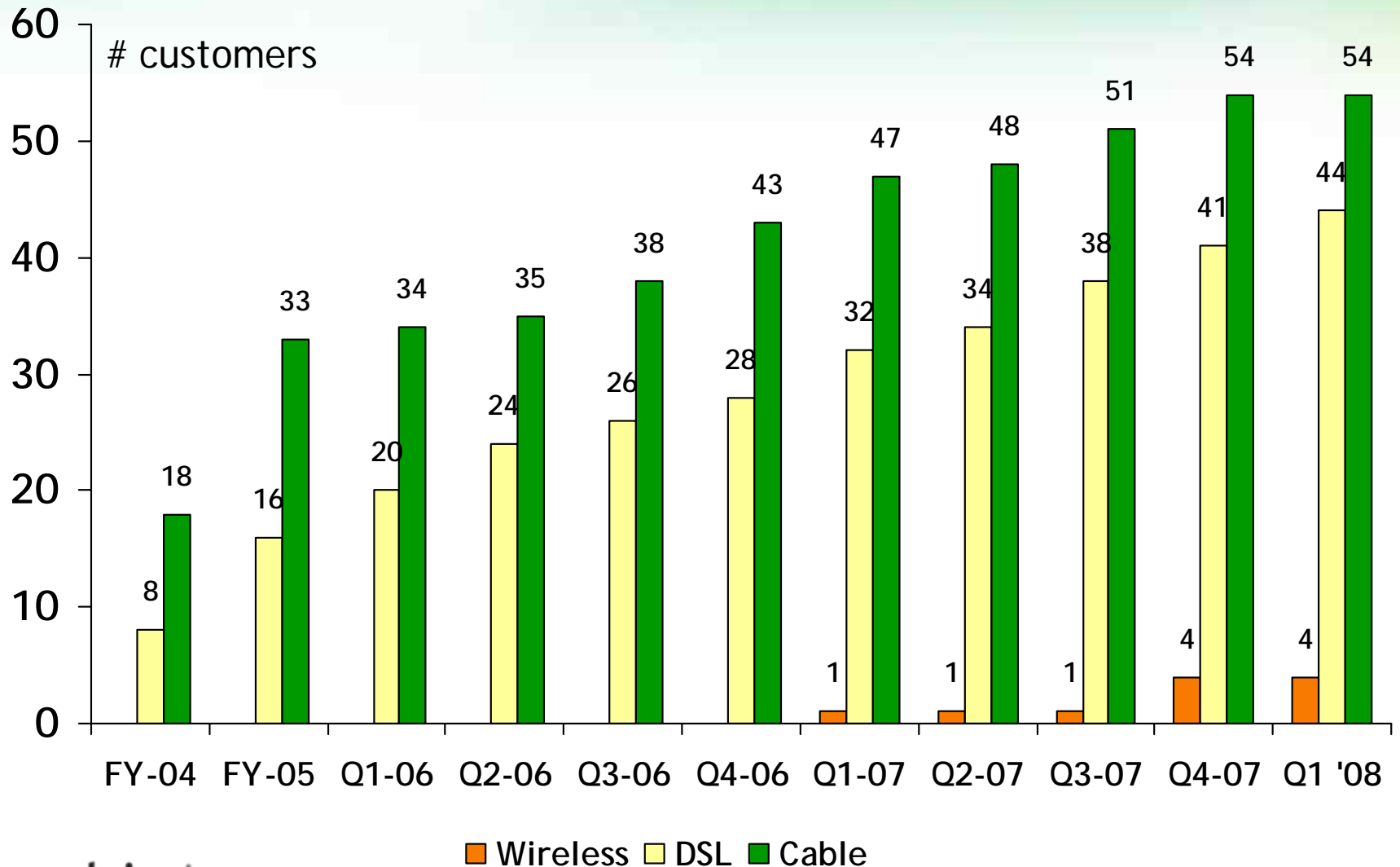
Send **60,000** messages

To **18,000** recipients

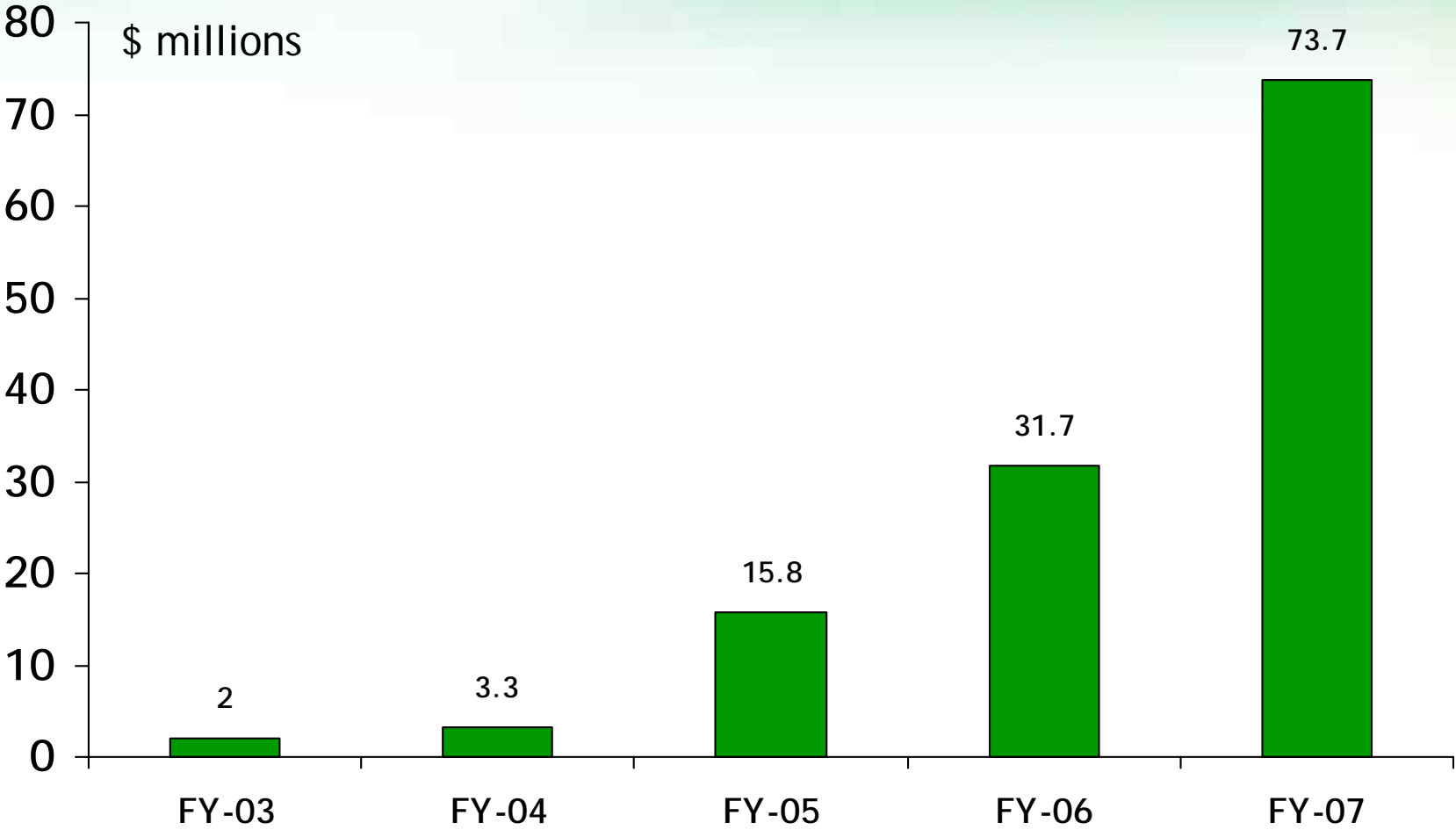
Key Take-Aways

- **Always users spamming** - amount of spammers on network peaks and troughs; but some always present
- **Subscribers call service provider** when spam grows, network performance decreases, driving up customer support costs
- Sandvine solutions: **Network Integrity** to scrub networks of spam, malicious traffic

Winning New Customers Across Markets



Growth



The Sandvine Way

➤ Customer First

- Make them Successful

➤ Showcase Flexibility

- Do Whatever it takes to make Sandvine Successful

➤ Under Promise/Over Deliver

- Aggressively Promise but make Commitment

➤ Amazing Tool Utilization

- Issue tracking, revision control, intranet...

➤ Team Work

- Work Hard/Play Hard

➤ Knowledge Sharing

- Over Communicate/Learning Environment, Design Reviews

➤ Zero Politics

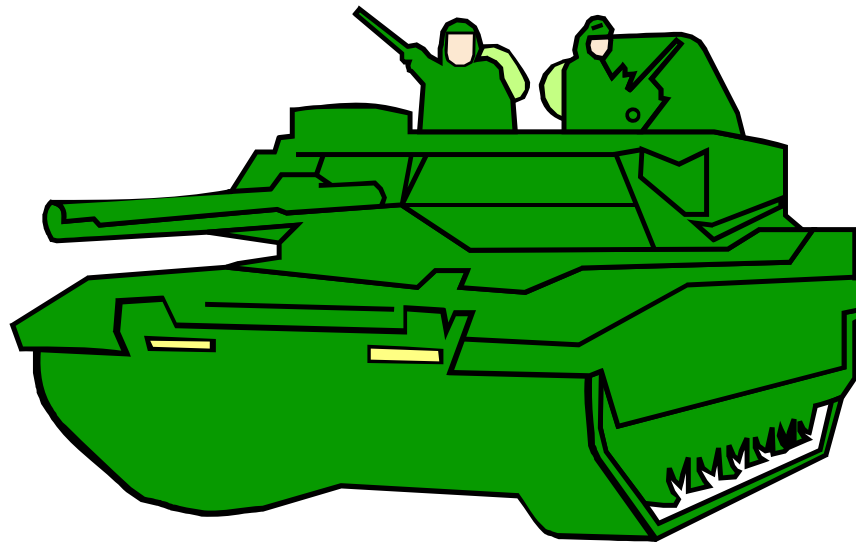
- Do the Right Thing, Everything else will take care of itself

➤ Risk Taking


- 3 out of 4 is better than 2 out of 2

Sandvine Way: Leaders 10 Commandments

- **5. Never complain downwards in the organization.**







“ ... Chances are you'll go far if you get
in with the right bunch of fellows ...”

Taking Care of Business

Randy Bachman



Intelligent Broadband Networks

