

Multi Camera Remote Production via the Internet



A Time Warner Company

Rick Ackermans
Director of Engineering
Turner Entertainment Networks



A Time Warner Company

**Turner Broadcastings coverage of
The 2014 Ryder Cup was produced
exclusively using internet camera
backhauls from Gleneagles in Perthshire,
Scotland to Atlanta.**



A Time Warner Company

- **12 Feeds from Scotland to Atlanta**
- **4 Return feeds Atlanta to Scotland**
- **All feeds 1080I 30 Mbps MPEG 4
4:2:2 10 bit long GOP**
- **All feeds to Atlanta 25 fps.**
- **Feeds were encapsulated using
Zixi DPR (Deep Packet Recovery)**





12 Feeds HD Feeds 1080I 25 fps



A Time Warner Company

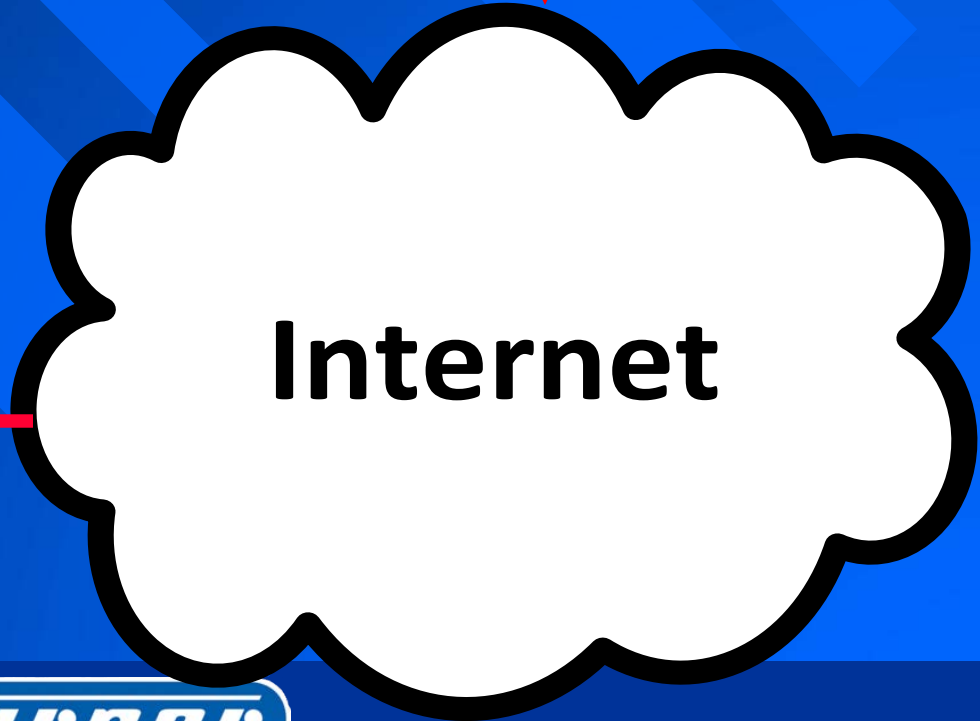


Gleneagles in Perthshire, Scotland

Dedicated Gig E



**BT Tower
London**



Internet



Turner Entertainment, Atlanta



A Time Warner Company

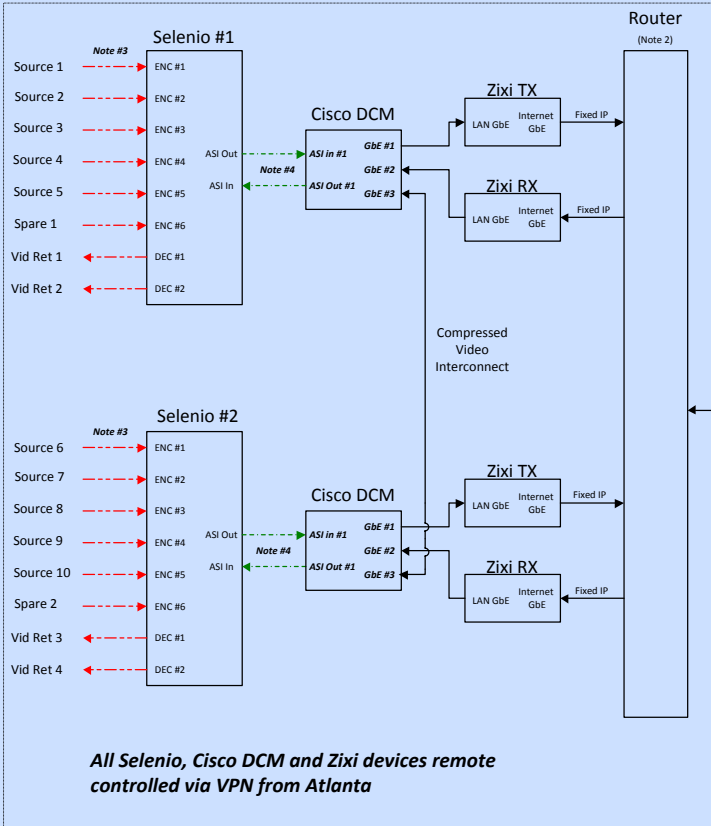
Total payload:

- 360 Mbps Scotland to Atlanta**
- 120 Mbps Atlanta to Scotland**
- In addition we had communication circuits via a separate internet VPN**

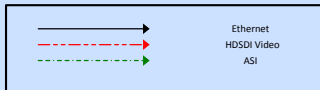
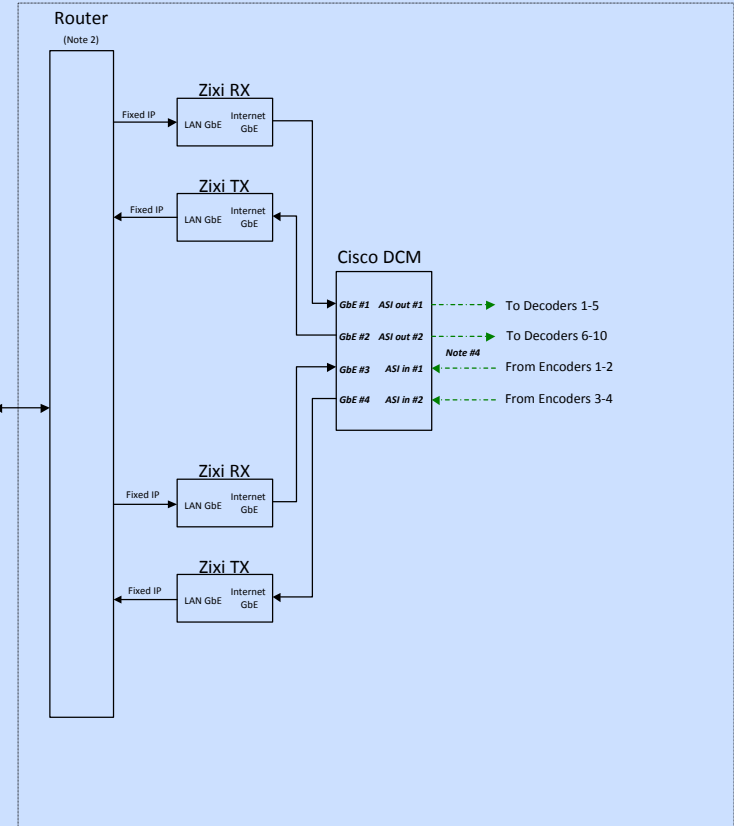


A Time Warner Company

Gleneagles, Perthshire, Scotland



Turner 1060 Techwood Atlanta



- Notes**
- 1) Arrow flow on GbE links shows direction of video flow.
 - 2) Routers not supported by Net Ops.. Provided by Turner EIS or UK Internet Provider
 - 3) All video feeds 30 Mbps (Each).
 - 4) Each UK to ATL path 180 Mbps (360 Mbps total) / Each ATL to UK path 60 Mbps (120 Mbps total)

- 5) VPN adapter supplied by Net Ops for device control not shown. It will require an internet IP address assigned via DHCP.

Turner Rider Cup Internet Camera Transport (V1.0)

Drawn By: Merrick Ackermans
Date: August 18, 2014



A Time Warner Company

Scotland



A Time Warner Company

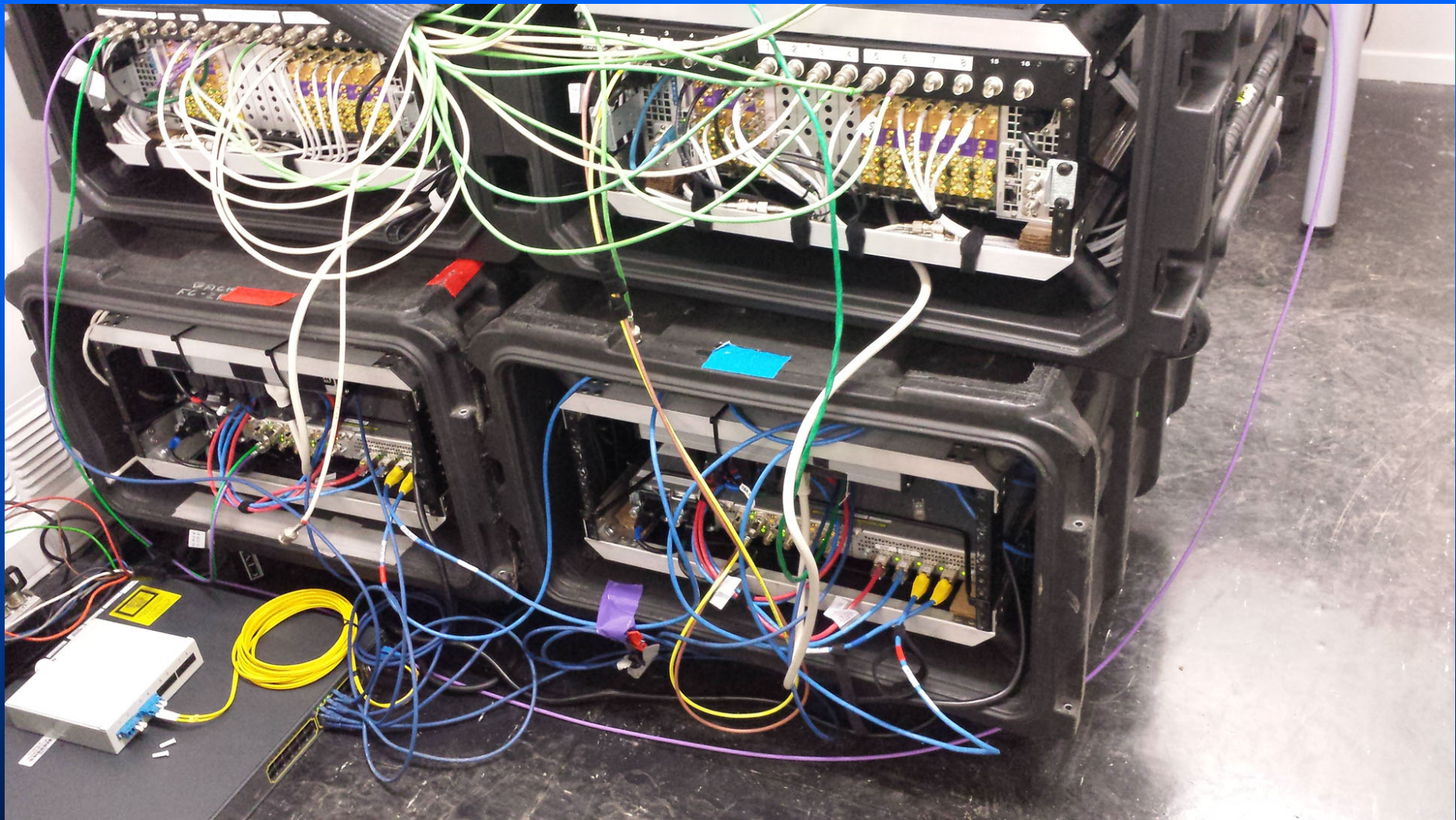


Turner

A Time Warner Company



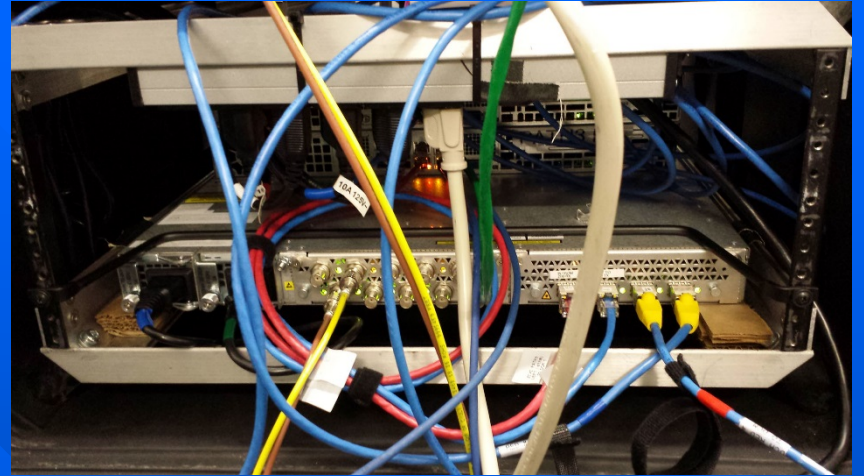
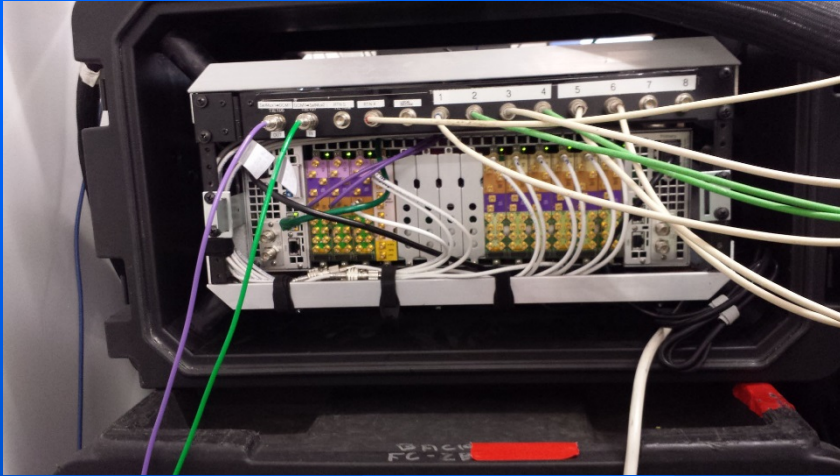
A Time Warner Company



A Time Warner Company



A Time Warner Company



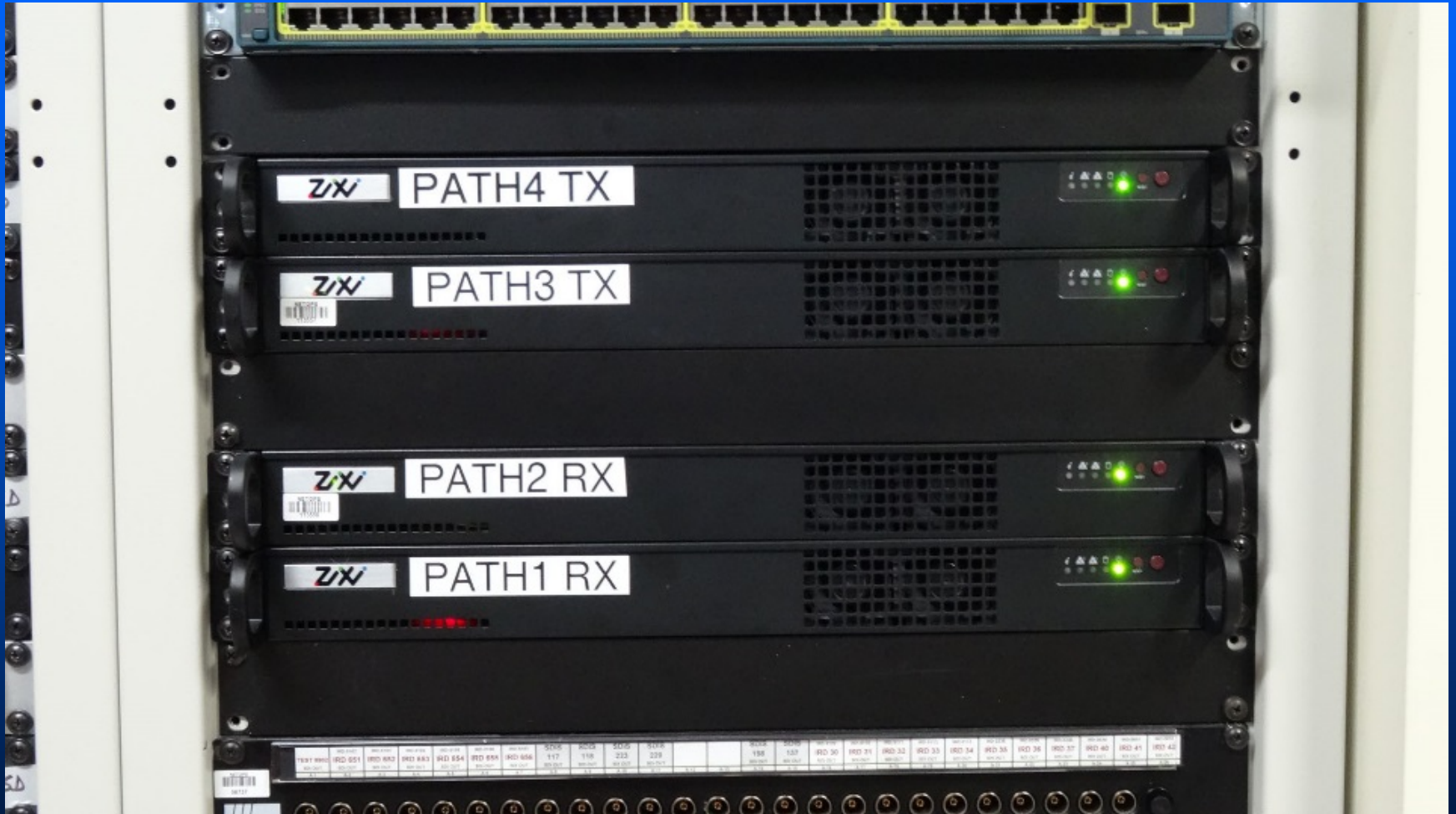
A Time Warner Company

Transmission Atlanta



A Time Warner Company

Zixi DPR



A Time Warner Company

While we used Zixi DPR many other providers have or are working on their own product.



A Time Warner Company



A Time Warner Company

IRDs



ATEME

Ericsson



A Time Warner Company



A Time Warner Company



A Time Warner Company

Turner Studios Atlanta



A Time Warner Company

**All equipment at Turner Studios
used for Rider Cup was operating
at 25 fps.**



A Time Warner Company



Turner

A Time Warner Company

Ikegami



A Time Warner Company



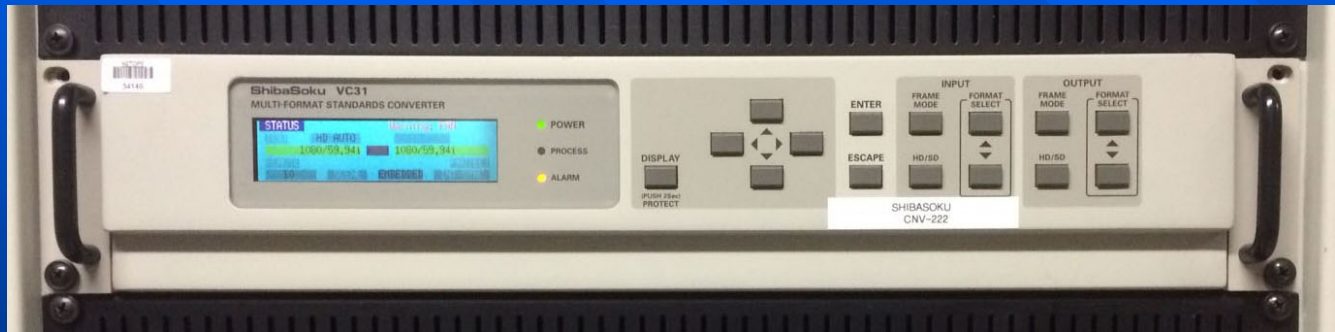
Turner

A Time Warner Company



Turner

A Time Warner Company




A Time Warner Company

2014 RYDER CUP LIVE Vid: x
 www.rydercup.com/live/player.html
 Apps DVB-S and DVB-S2 B... IP Subnet Calculator... Imported From IE NCAA Final four

September 23, 2014 | Glengolf Hotel, Prestons, Scotland

RYDER CUP 2014

Live Video Presented by **National Car Rental**



RYDER CUP LIVE NOW PLAYING

PRESS ROOM FRIDAY 1:00 PM ET

SIMULCAST

National OFFICIAL PARTNER
 JOIN THE COMPLIMENTARY EMERALD CLUB TODAY
 ENROLL NOW

2014 OFFICIAL US RYDER CUP TEAM UNIFORMS
 GET WHAT THE PLAYERS ARE WEARING

RYDER CUP USA

11:35 AM 9/26/2014

DELL



A Time Warner Company

The Internet is Free !!!!!
Well not really.....



A Time Warner Company

Peering Agreements Transit Costs.



A Time Warner Company

Transit Costs

Year	Amount (1 Mbps/Month)	Decrease
1998	\$ 1,200.00	
1999	\$ 800.00	33%
2000	\$ 675.00	16%
2001	\$ 400.00	41%
2002	\$ 200.00	50%
2003	\$ 120.00	40%
2004	\$ 90.00	25%
2005	\$ 75.00	17%
2006	\$ 50.00	33%
2007	\$ 25.00	50%
2008	\$ 12.00	52%
2009	\$ 9.00	25%
2010	\$ 5.00	44%
2011	\$ 3.25	35%
2012	\$ 2.34	28%
2013	\$ 1.57	33%
2014	\$ 0.94	40%
2015	\$ 0.63	33%



A Time Warner Company



A Time Warner Company