W.I.A.P.C.F
When It Absolutely Positively Cannot Fail
If something goes wrong when you are streaming a live event, it is usually just too late. Chances are everything was fine just a few minutes before the broadcast, but now it’s not working. And your online audience is frustrated. Some are giving up. Others are sending you nasty messages. You feel helpless.

So how do you create a live streaming capability that is the most immune to failure?

It’s Not Your Fault

The first thing to realize is that when one viewer cannot see your video, there is a good change it’s not your fault. The viewer may be attempting to view your broadband stream via dial-up connection, their computer could have trouble, or there could be host of other issues that exist with the viewer well beyond your control.

But assuming the issue is not with the viewer, there are several key components of streaming that, if overlooked, can lead to failure.

It’s Your Fault

There is a well-worn list of common mistakes people make when streaming a live event. Here is a brief list:

- **Streaming Rate** – Just because you can stream at 3 Mbps does not mean your audience can receive 3 Mbps. Use a rate or rates that matches your audience’s ability to receive. The safest broadband rate today is about 300 Kbps, with an optional “MBR” rate of 700 Kbps.

- **Format** – Select a format that viewers can receive. Windows Media using Silverlight viewing is supported on all popular desktops, including Windows and Apple, IE, FireFox, and Safari. Windows Media is also supported on Set Top Boxes, Cell Phones, and PDA’s, and is the most popular live video streaming format in the world today. Windows Media (VC-1) is also a multi-vendor, SMPTE standard.

- **Source** – Use a dedicated live streaming appliance. A PC with a capture card is a good solution for authoring stored video, but is subject to reboot and sudden failures for live video.

- **Network** – You need enough outbound network bandwidth to stream to the distribution network. Saying you have “a T1” could be meaningless when it is shared with corporate users. You don’t want to be surprised when your live stream gets choppy because someone on your corporate network is downloading YouTube videos.

- **A/V** – While we are going to concentrate on streaming and network configurations, don’t forget that you will have no audio or video if someone trips over your camera and wires! Live streaming begins the moment a photon hits a camera lens and continues until a photon reaches a viewer’s eye. Anything in between can be the source of a failure.

- **Buck-Passing** – Not having “one throat to choke” can be a huge problem for those that “roll their own”. Problem resolution could easily involve the coordination of four or more vendors, a virtual impossibility when a live event goes wrong. VBrick’s VBoss is a comprehensive service that manages all aspects of the streaming, and our partners can help you with the A/V gear if you need it.
**The Stream Path**

A live video stream originates from a VBrick appliance. The appliance sends the stream to a network that has sufficient bandwidth to distribute it to the required number of viewers.

A key aspect of the VBrick source is its ability to be physically located virtually anywhere. Other solutions typically require the source to be on an “outside” IP address...fully exposed to the public Internet. VBrick is different and it can “push” the stream through conventional firewalls, and can be remotely configured and managed regardless of its IP address.

![Figure 1](image1.png)

Figure 1 illustrates a simple configuration where the VBrick is delivering live video to a Content Distribution Network (CDN), and it is displayed in a web page generated by the VBoss server. The web page displays the live video by requesting it from the CDN. There may be any number of web pages delivered by the VBoss server and any number of streams delivered by the CDN.

**One VBrick, Multiple CDNs**

For higher availability, one VBrick appliance can send the live video stream to multiple CDNs.

![Figure 2](image2.png)

Figure 2 illustrates how one VBrick can be provisioned to send live video up to 25 CDNs. Of course, duplicate bandwidth is needed for duplicate CDNs. If you are streaming at 300 Kbps, you need 600 Kbps to support two CDNs.

If streaming using Multiple Bit Rate encoding (MBR), each bit rate is included in each stream, increasing bandwidth needs. If you are streaming using 100 Kbps, 300 Kbps and 700 Kbps, that is a total stream rate of 1100 Kbps. You will need 1100 for each CDN being used, perhaps leading to supporting multiple physical network access circuits, described next.
Multiple VBricks, Multiple CDNs

The “Belts and Suspenders” approach is to provision multiple VBricks, multiple networks, and multiple CDNs, illustrated in Figure 3. This approach is not overkill for true W.I.A.P.C.F streaming. The VBrick appliance is “insanely reliable” and virus-proof – never needing a reboot and automatically reestablishing connections to CDNs. It is a true appliance with an embedded operating system.

The VBoss server is reliable and is hosted with world-class power backup and supported by seven carriers with physical diversity.

The CDNs are also world-class and rarely fail completely. The most fragile component of the system is often the local Internet connection. Having two or more dedicated DSL, Cable, T1 or similar connections provides network access redundancy.

Branch Office Reliability

So far, we have explored W.I.A.P.C.F. streaming from the perspective of getting the video steam to a viewer that is capable of receiving it. For consumers with broadband Internet connections, this is usually sufficient.

However, how could 1,000 employees in a remote branch office view the live video? If we were steaming at 300 Kbps, each viewer would draw a stream from the CDN, which the CDN can certainly support. But 1,000 viewers x 300 Kbps is 300 Mbps! Few remote branch offices have sufficient Internet access to support this much bandwidth…most are lucky to have 1 to 2 Mbps.

Branch offices are supported by the VBrick Reflector, shown in Figure 4.
The Reflector is simply located inside the firewall at the remote office. The VBoss server can automatically configure it, and the Reflector pulls just one stream from the CDN, and only when there is one or more branch office viewers.

As its name implies, the VBrick Reflector then duplicates (or “reflects”) the stream to branch office viewers via multicast and/or unicast. In other words, it delivers the equivalent of 300 Mbps using only 300 Kbps, a 100X bandwidth savings!

**Satellites**

Another bandwidth provisioning option is to use satellite services. VSAT and BGAN services can be easy to deploy and can be more cost effective than installing a backup DSL line when you need the bandwidth for limited periods.

Language is important when speaking with many satellite service providers: you want high-speed Internet access, not video service. If you mention video, the satellite operator may think you want an expensive “DVB” video service that can only be received by organizations with satellite receivers.

For streaming, satellite service is merely an alternative to terrestrial wire or fiber, and does not address system redundancy.

**Successful Live Streaming**

VBrick has delivered thousands of highly successful live streaming events.

The University of California is an example of live streaming reliability: they have been streaming on the public Internet non-stop for four years and they have never rebooted their VBrick or experienced a network outage, and there is no special redundancy.
About VBrick Systems, Inc.

VBrick is the leader in Enterprise IP Video solutions, with over 6,000 corporate, education and government customers and 60,000 installations worldwide. VBrick solutions work over standard IP networks and the Internet to deliver rich media communications that connect people everywhere – from employees and customers, to partners and shareholders. Our comprehensive product suite and end-to-end solutions are used in a wide range of live and on-demand applications including meeting and event broadcasts, distance learning, digital signage, TV distribution, video surveillance, and Web-based marketing campaigns. Headquartered in Wallingford, CT, VBrick’s products and services are available through industry-leading value-added resellers.

For more information, visit www.vbrick.com