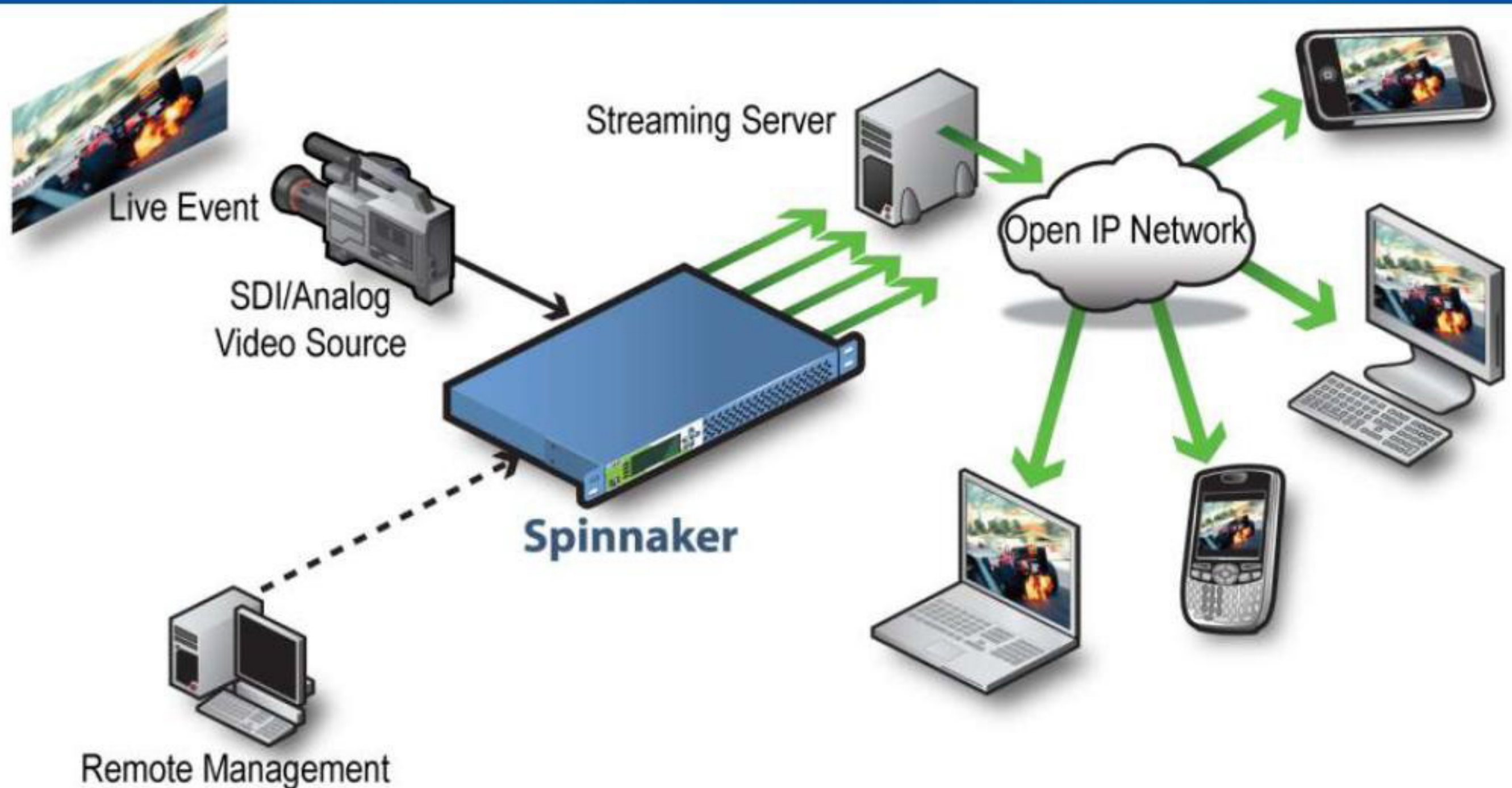
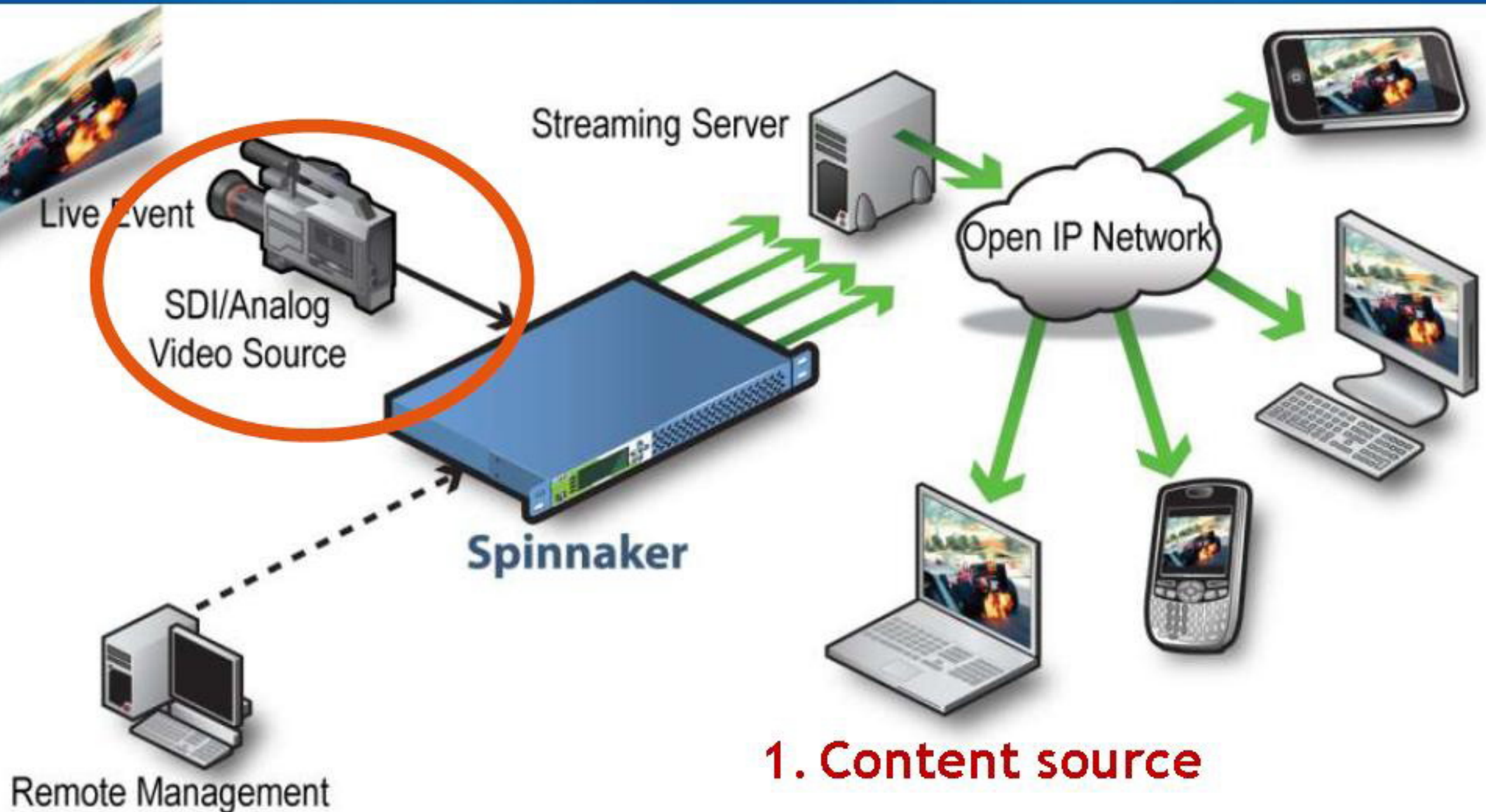


# Traditional: Live streaming to Web

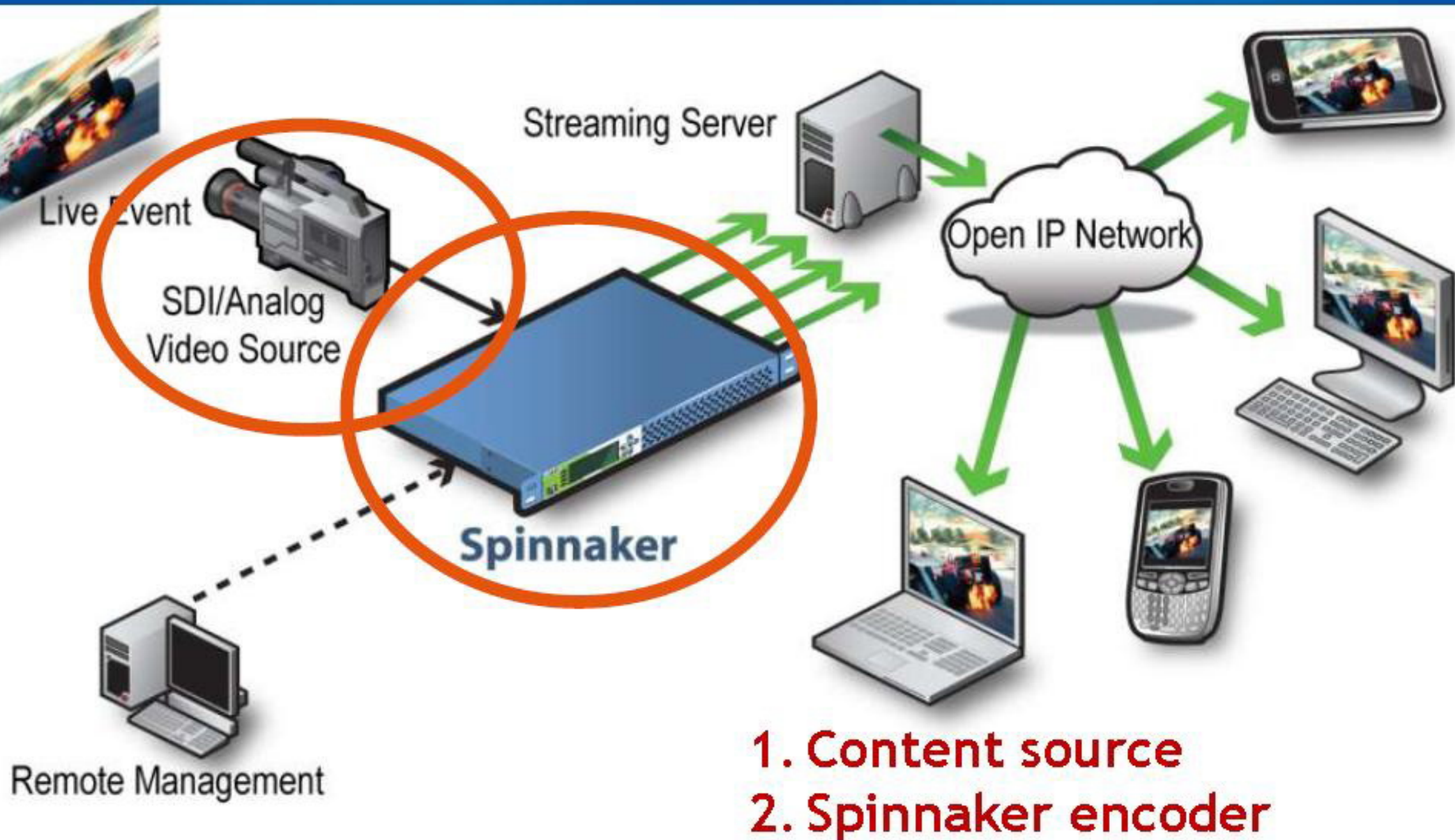


# Traditional: Live streaming to Web



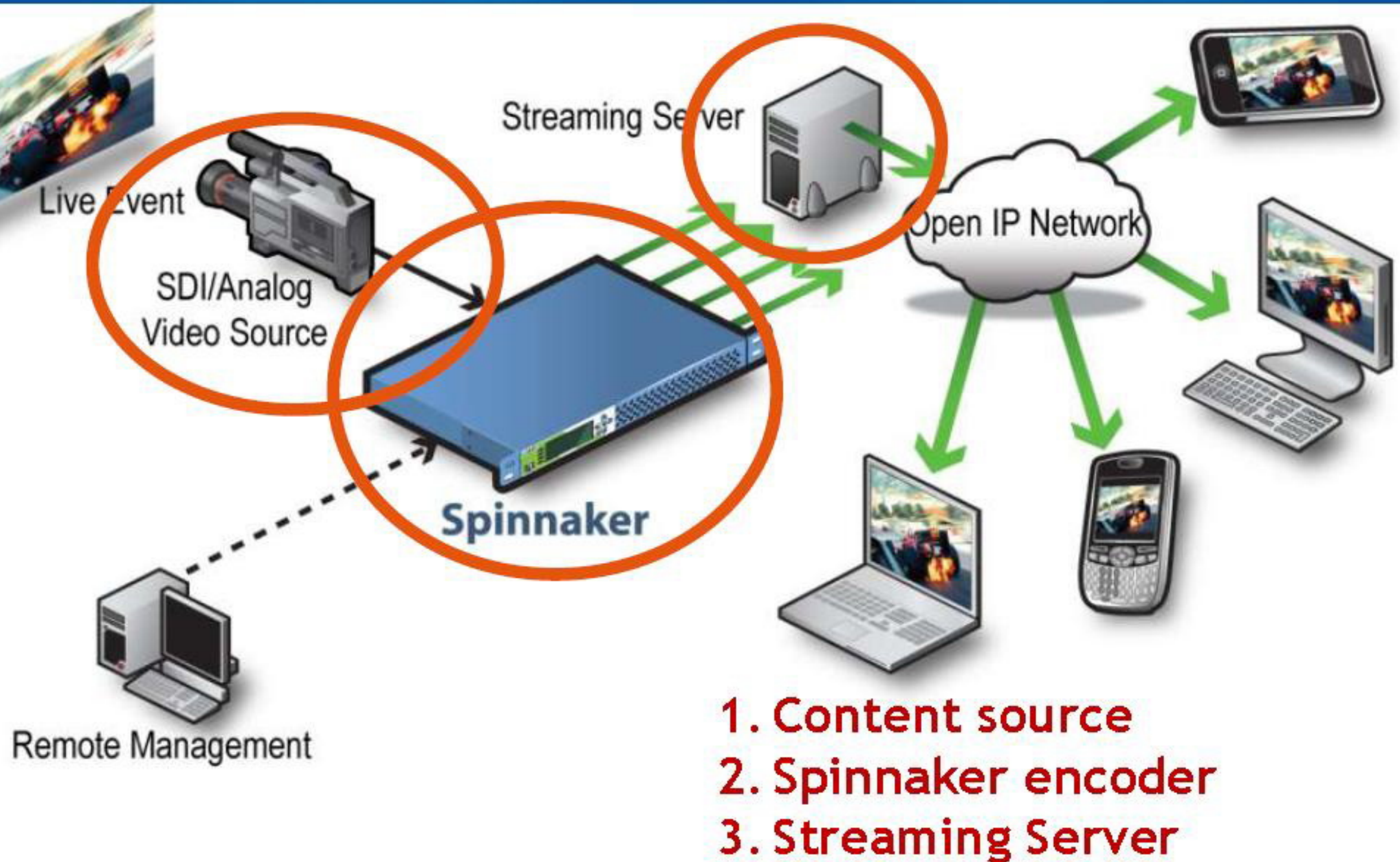


# Traditional: Live streaming to Web



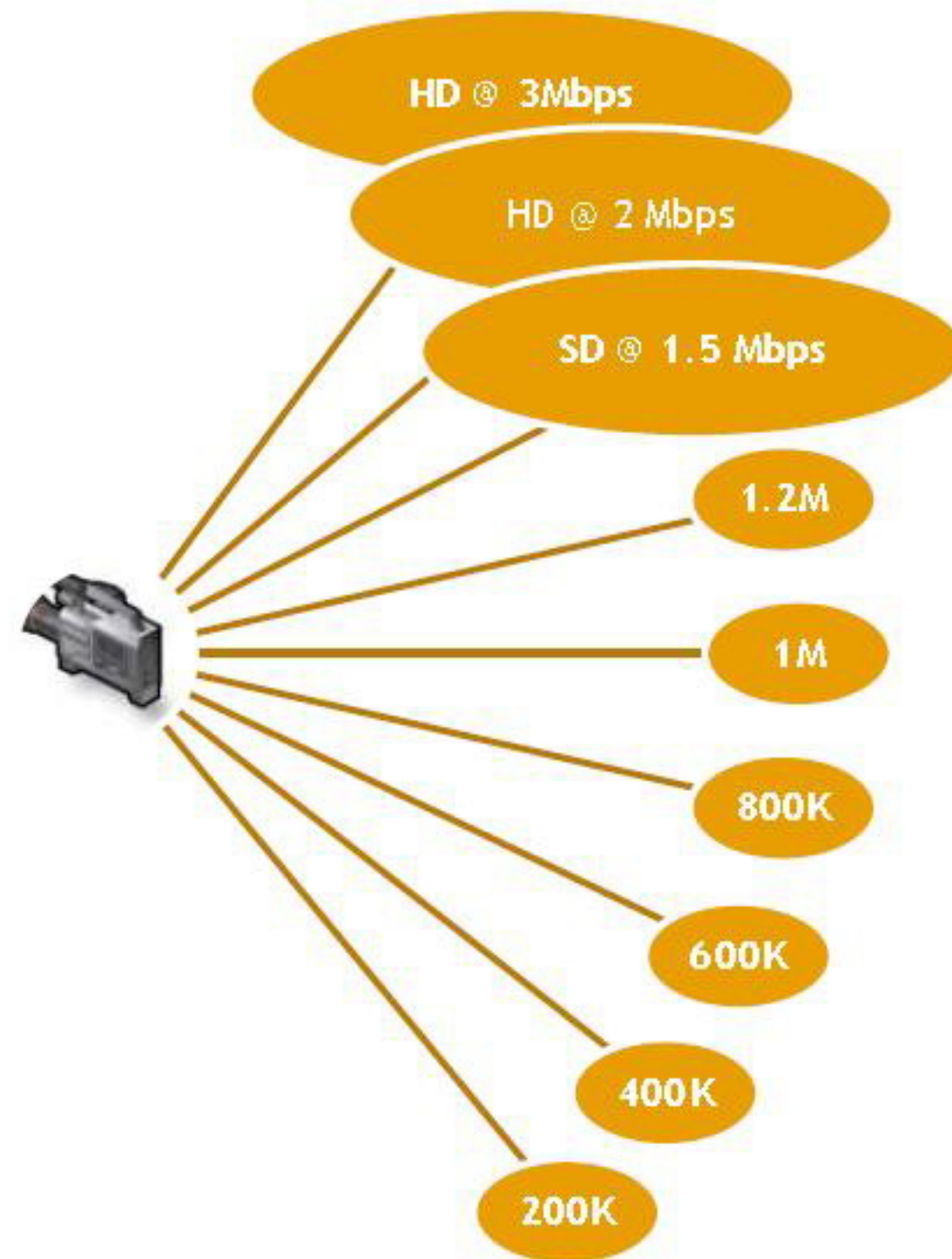


# Traditional: Live streaming to Web



# Live Challenges

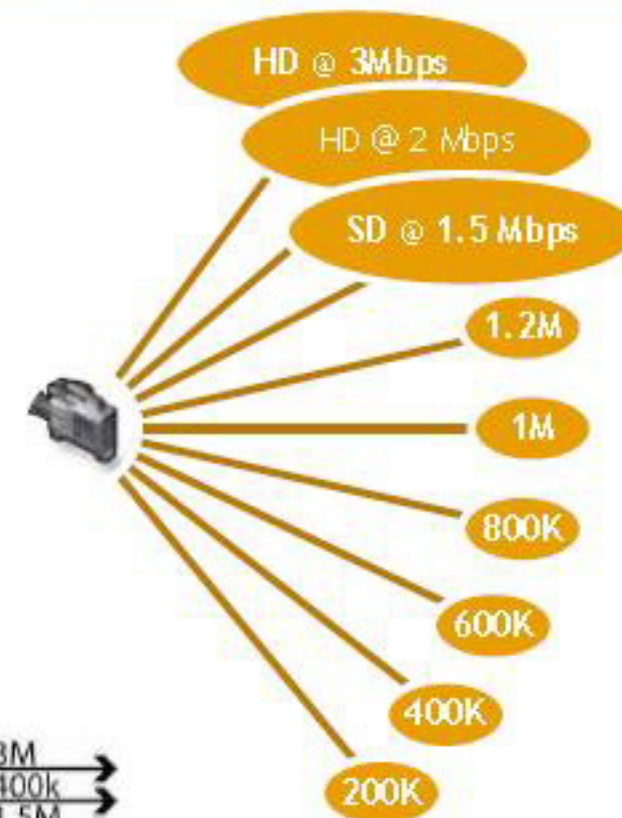
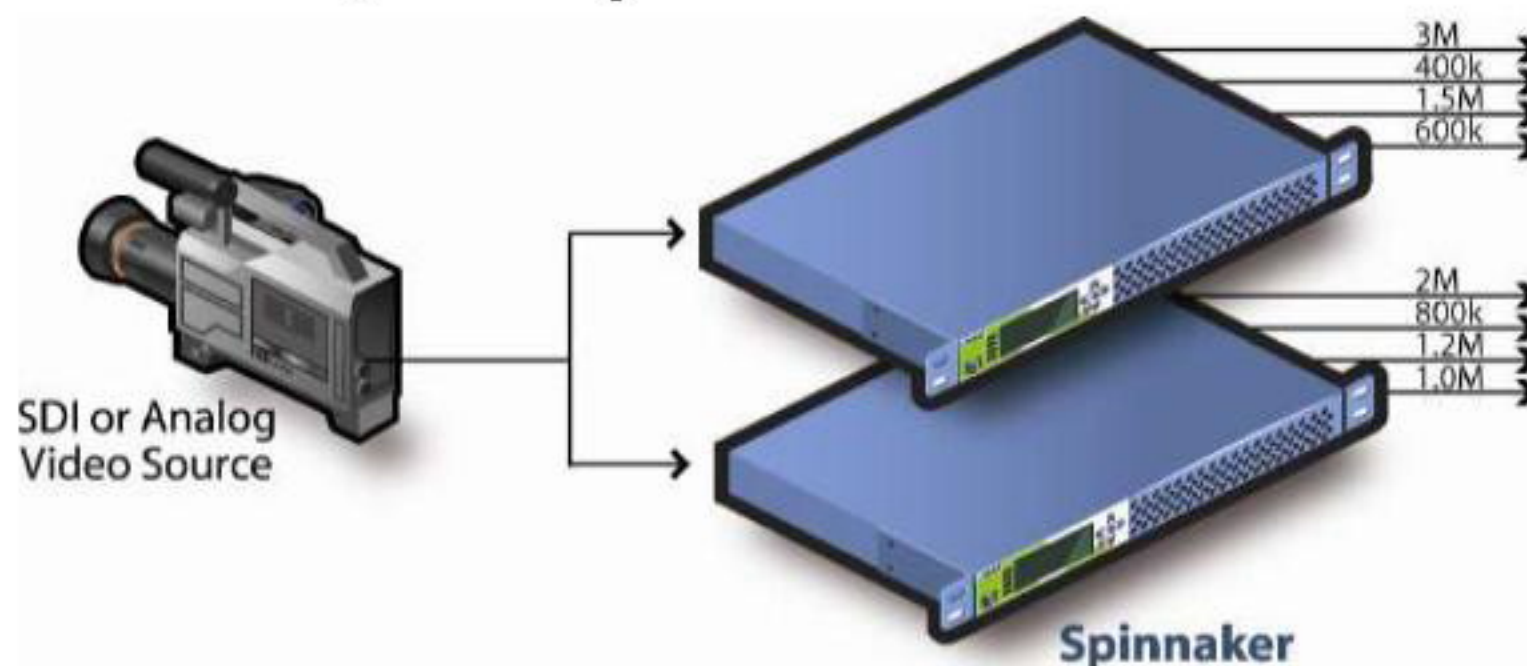
- It happens **ONCE!**
- **One source → many outputs**
  - Not all outputs from single encoder





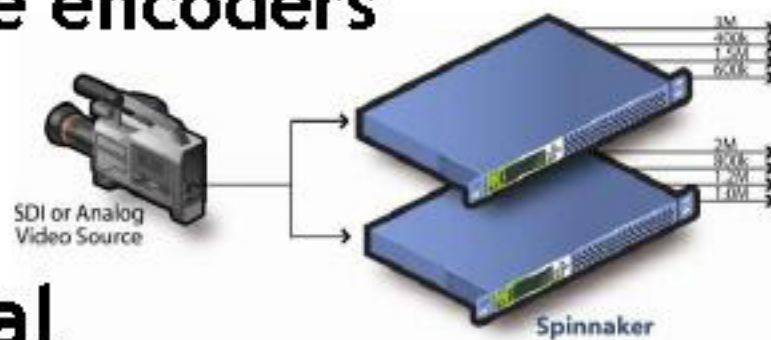
# Live Challenges

- It happens **ONCE!**
- One source → many outputs
  - Not all outputs from single encoder
- One source → multiple encoders

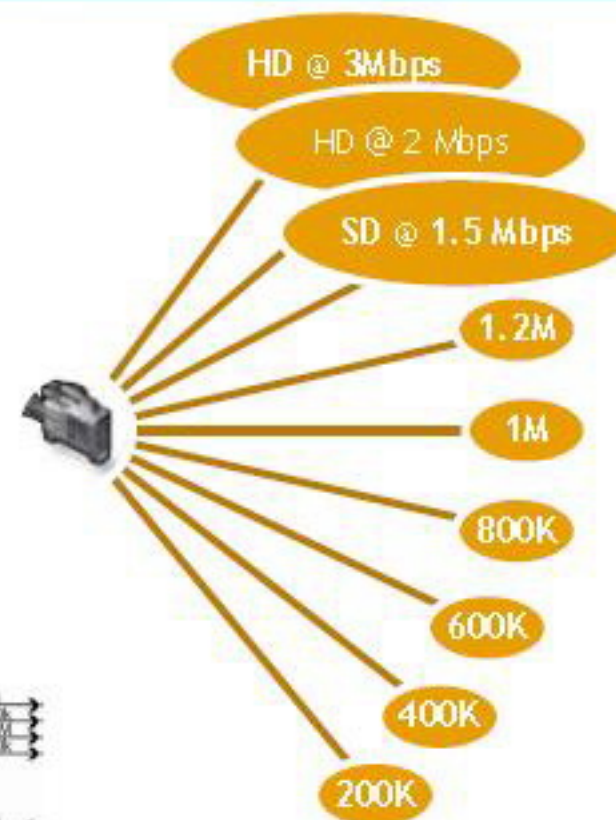


# Live Challenges

- It happens **ONCE!**
- **One source → many outputs**
  - Not all outputs from single encoder
- **One source → multiple encoders**

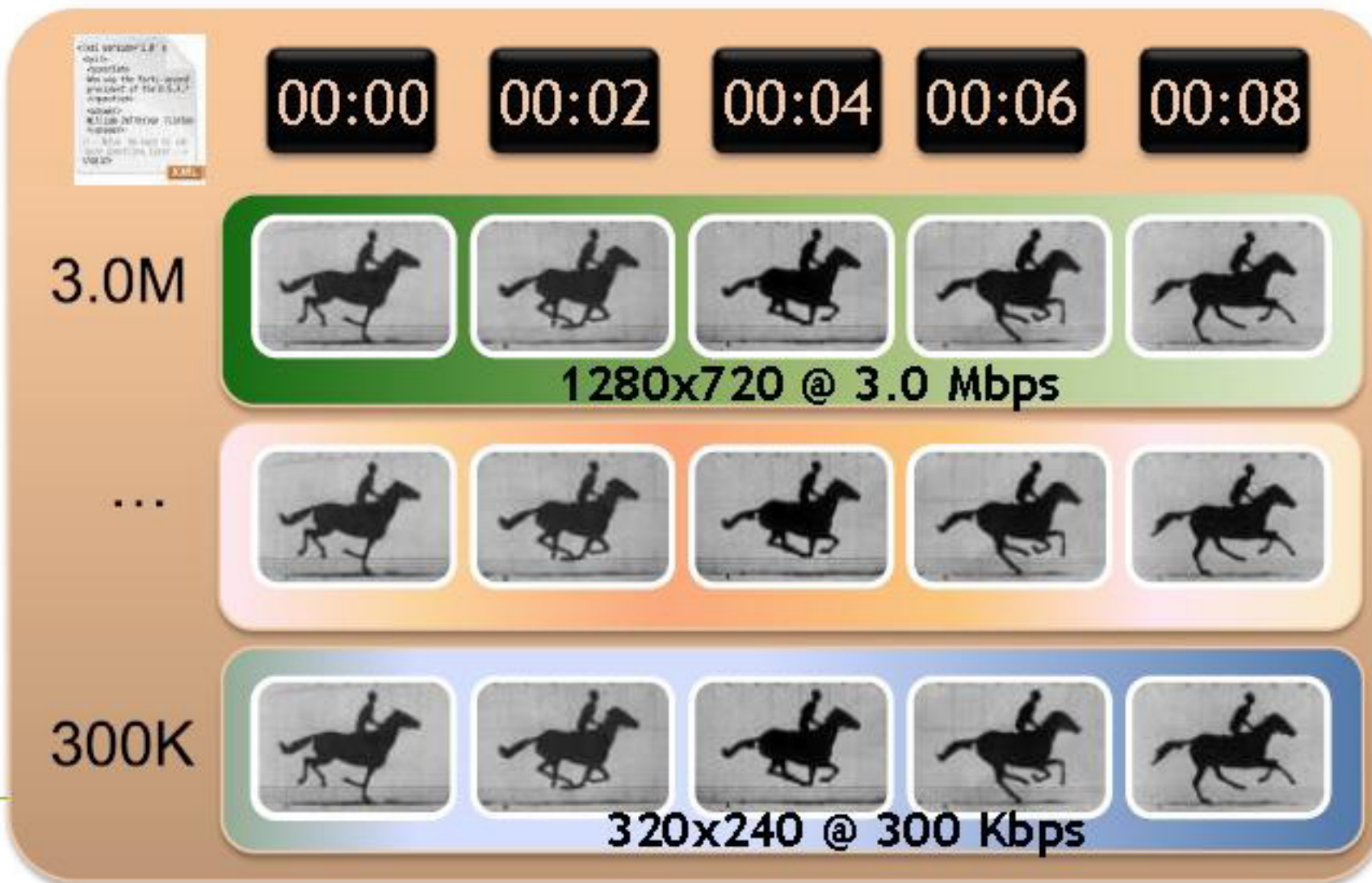


- **Time sync is critical**
  - Frame accurate GOP alignment
  - Frame accurate Time alignment
- **Redundancy must be considered**
  - Failover encoders must adhere to established timing
  - Multi-publish points from encoders





# Adapting Bit Rate in Real-Time





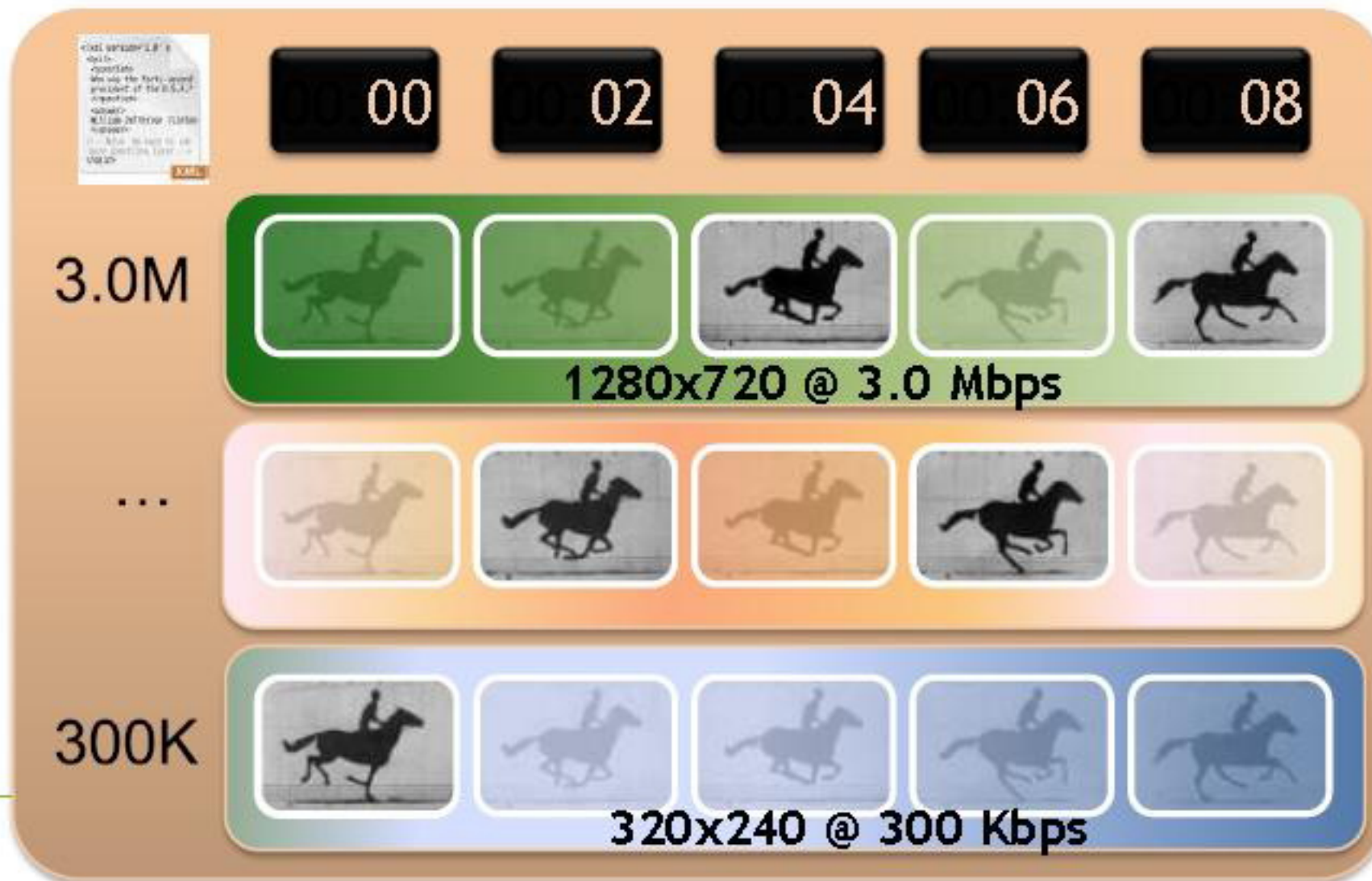
# Adapting Bit Rate in Real-Time



300K @ 00:00?  
700K @ 00:02?  
3.0M @ 00:04?  
1.5M @ 00:06?  
3.0M @ 00:08?



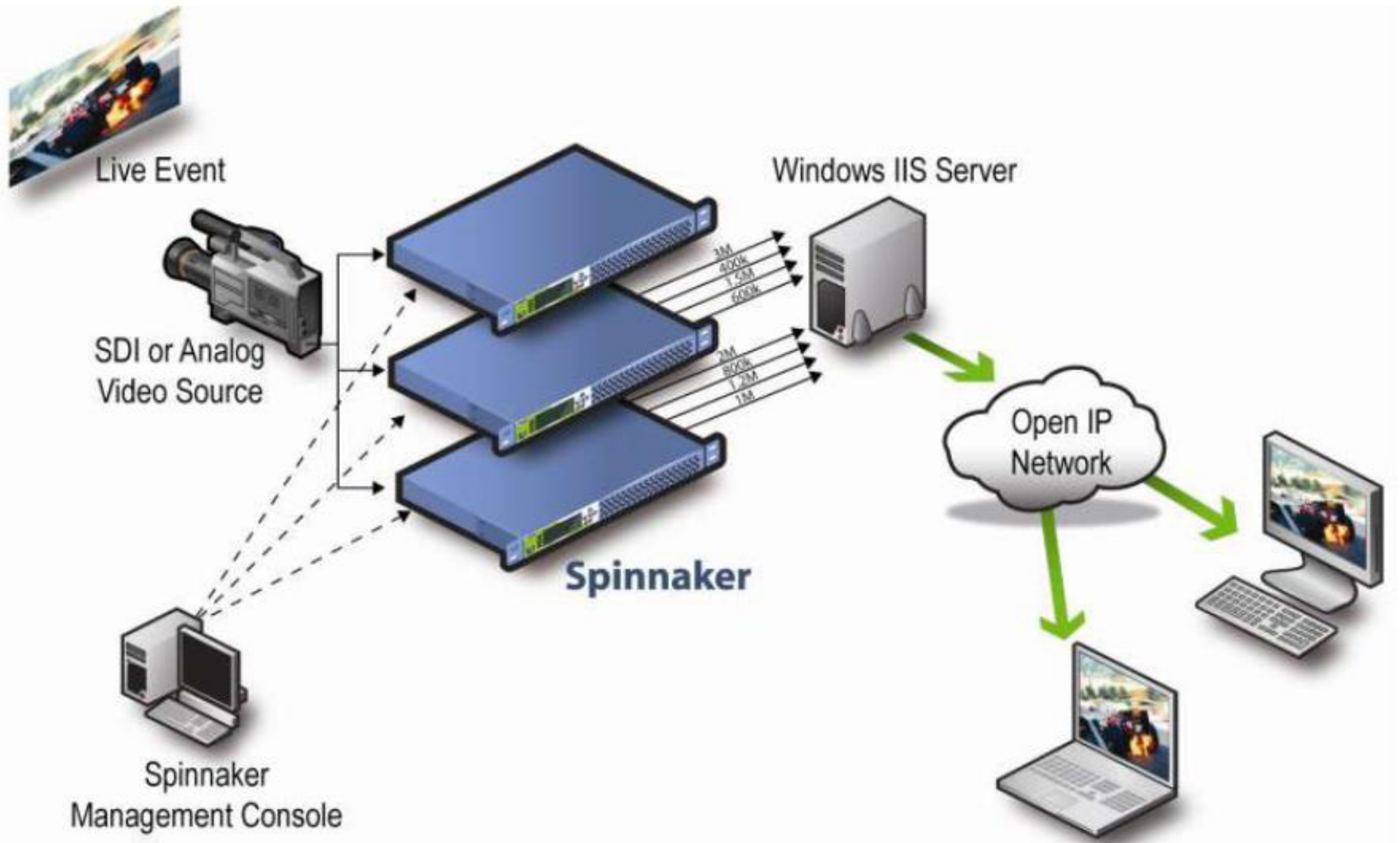
300K (start quickly)  
700K (good network)  
2.4M (great network)  
1.5M (glitch)  
3.0M (play on...)



Bit rate &  
frame rate  
heuristics

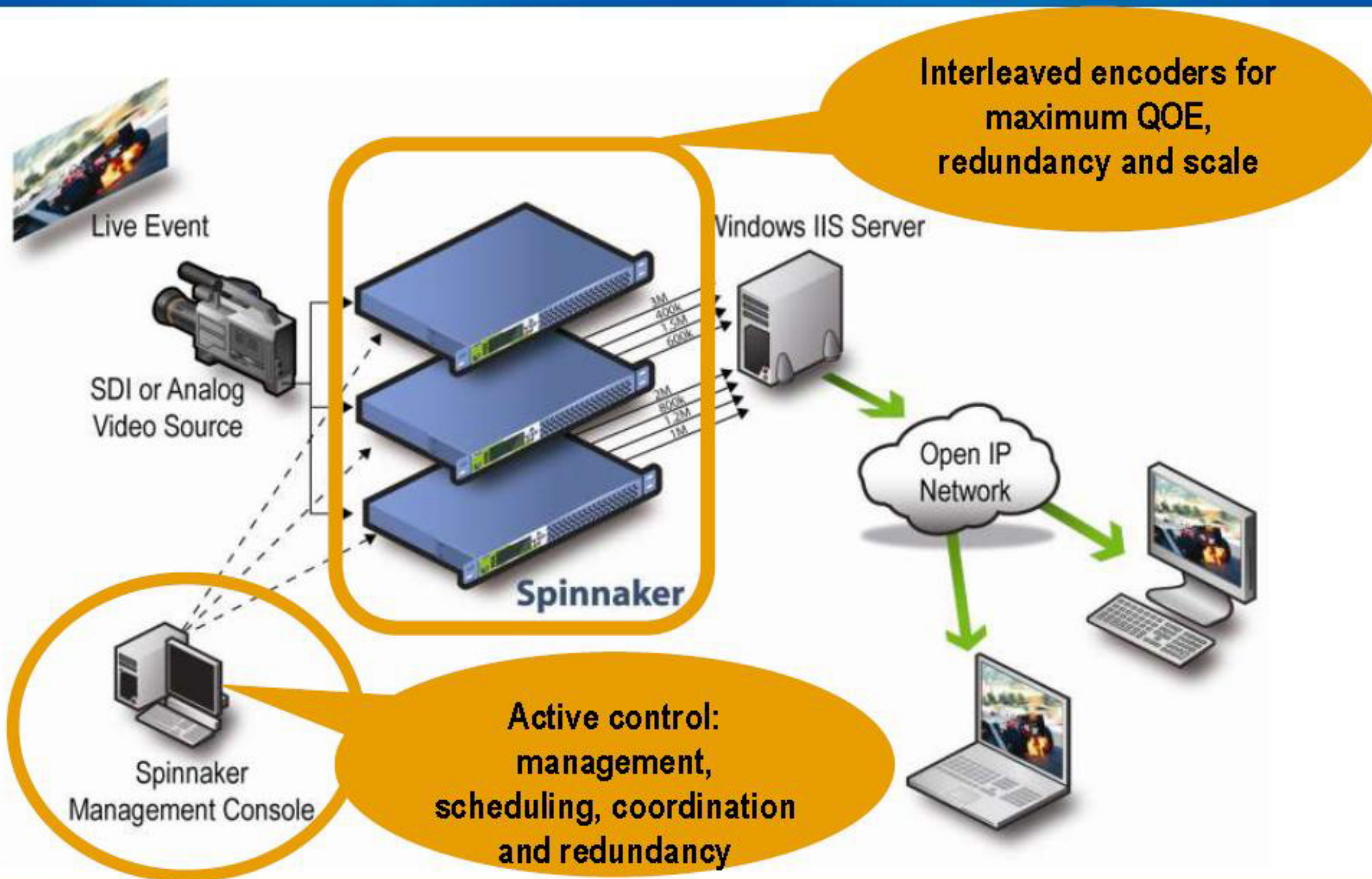


# Live Smooth Stream overview



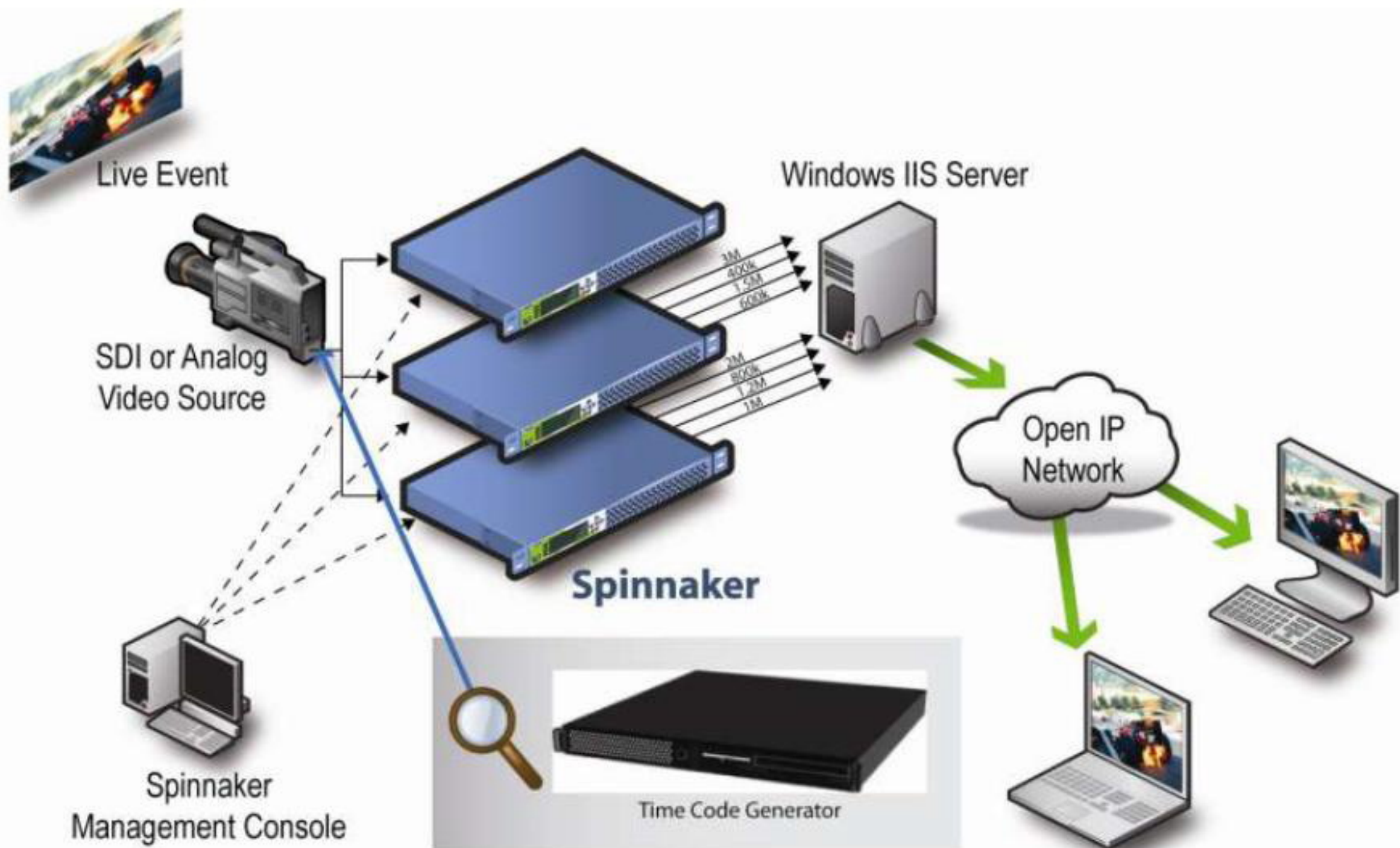


# Live Smooth Stream overview



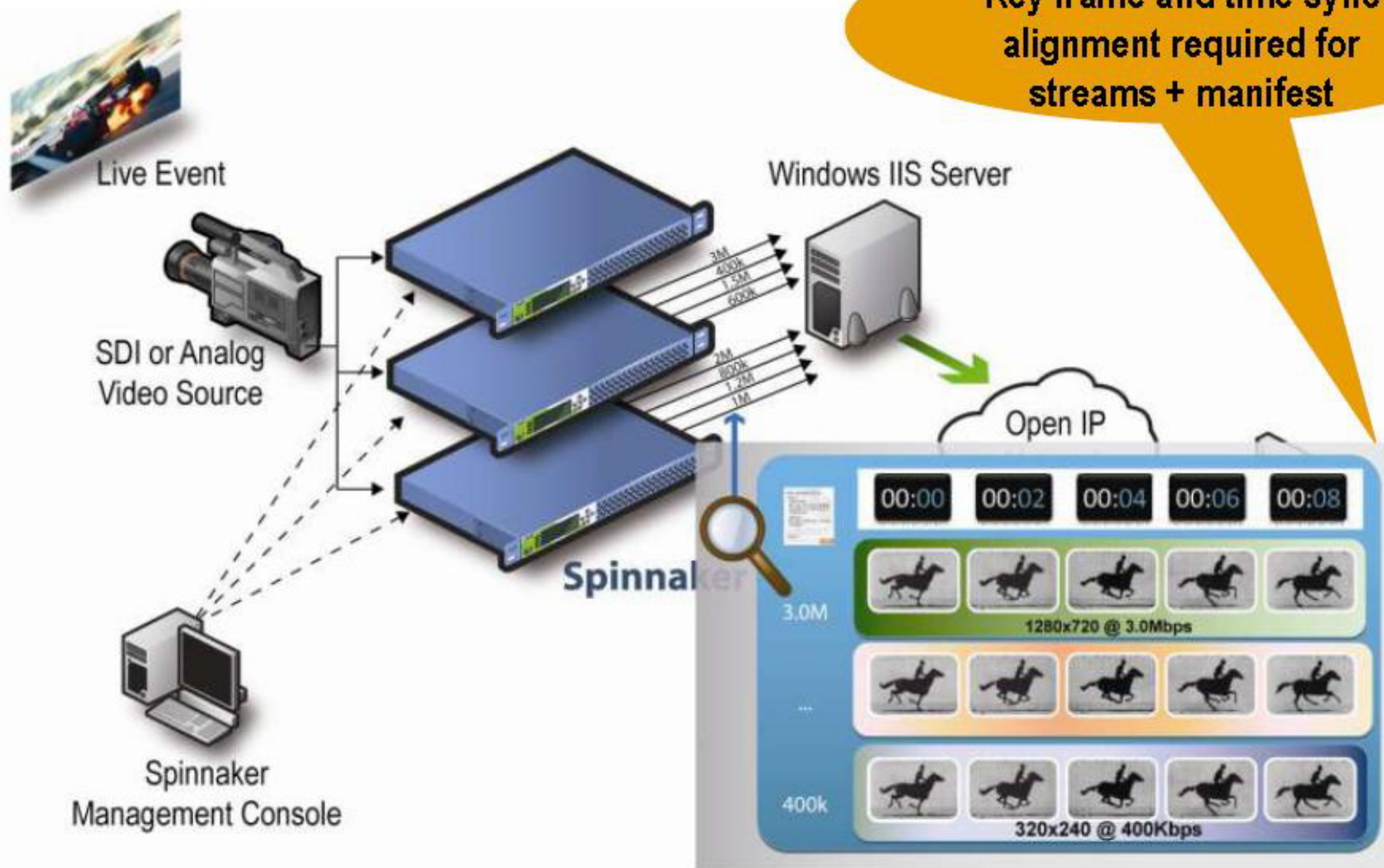


# Live Smooth - source to encoder close-up



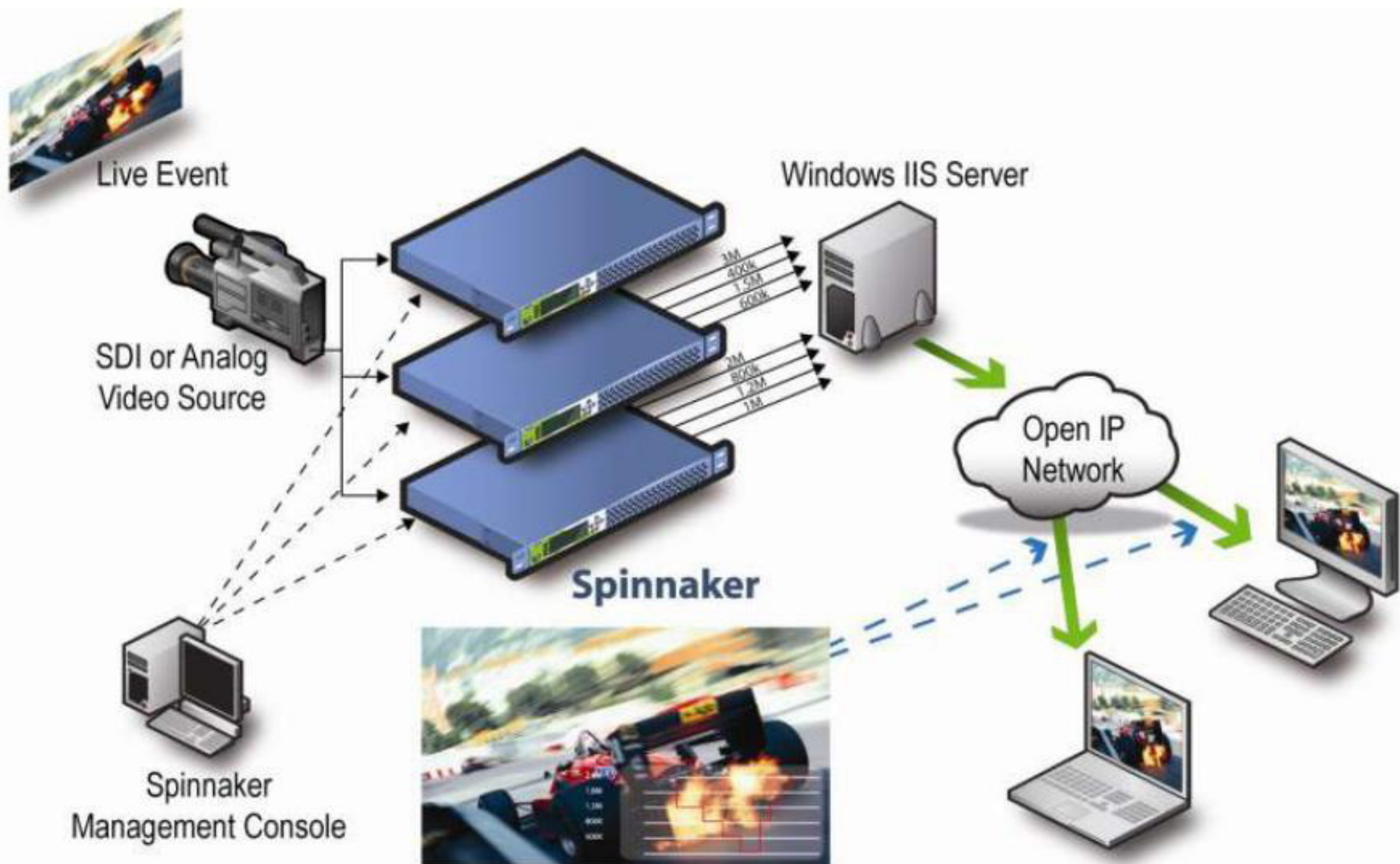


# Live Smooth - Encoder output





# Live Smooth - Player close-up





# Live Smooth Streaming benefits

## • User experience

- Dramatic increase in Quality Of Experience (QOE)
  - Eliminates the “re-buffering” experience
    - Increases content stickiness
    - Enhances time spent watching (TSW)
  - One click & watch
    - No more high, med, low
    - Instant on
  - Transparent user experience

## • Infrastructure

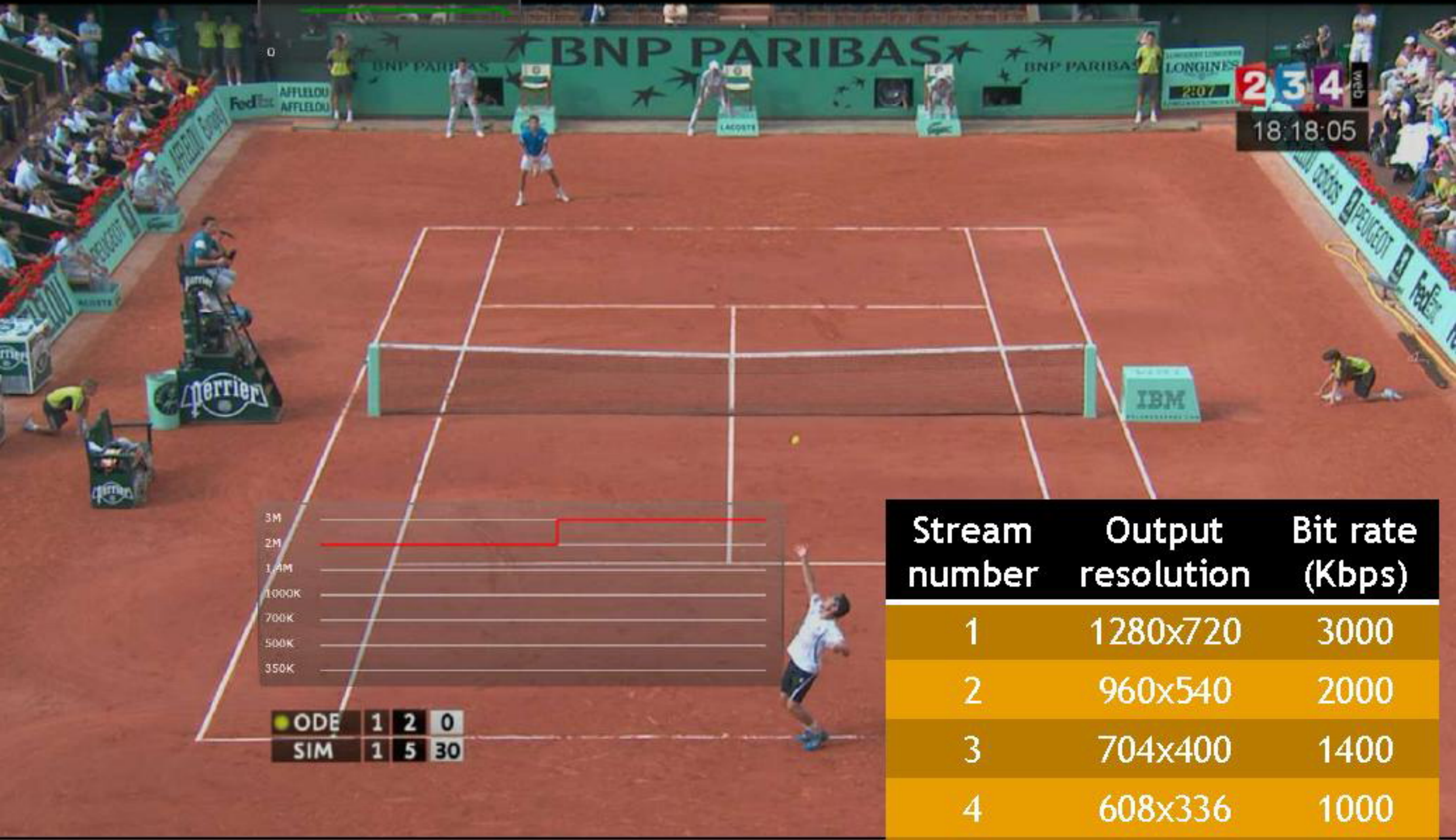
- Non-disruptive encoding changes
- Faster time to VOD
- Increased redundancy options
  - Encoder redundancy
  - Server redundancy
- Lower TCO
  - Leverages existing HTTP infrastructure





Max  
Frame Rate (23) fps

Now Downloading Bitrate 3000 kbps Limit Max Bitrate 3000 kbps



2 3 4  
18:18:05



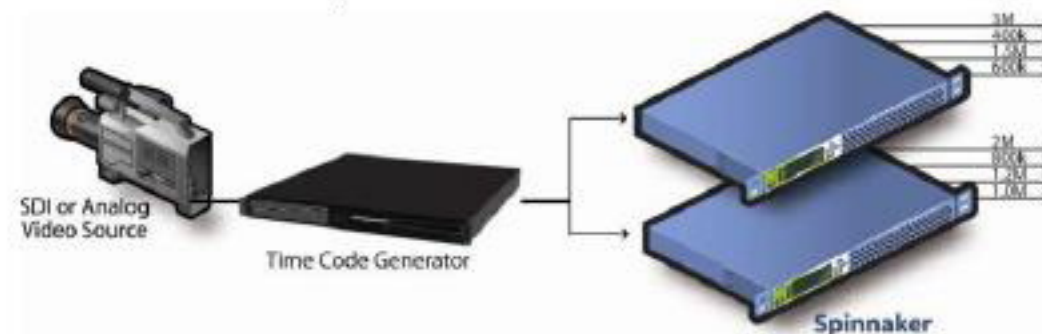
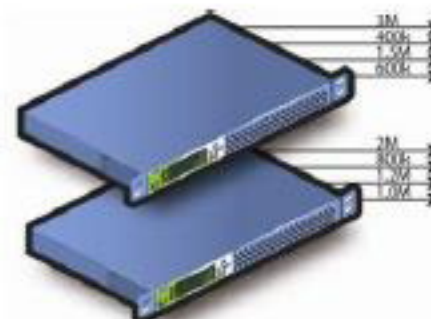
● ODE 1 2 0  
SIM 1 5 30

Stream number	Output resolution	Bit rate (Kbps)
1	1280x720	3000
2	960x540	2000
3	704x400	1400
4	608x336	1000
5	448x256	700
6	336x192	500
7	288x160	350



# Architecture considerations

- Use HD source even for SD output
- Interleave encoders for redundancy
- For multiple encoder setup time code is required



- Publish to multiple IIS servers for redundancy
- Consider data rate between encoders and IIS Servers
- Do a dry run
- Sit back and enjoy

All the templates for transcoding are stored on the server and can be edited and managed via the client interface.

Monitor & Manage Node Activity, Job Queue, Active Jobs, Completed Jobs, & all System Events from a simple, reconfigurable table.

The screenshot displays the Armada Manager interface with several key sections:

- Templates:** A list of transcoding templates such as 'Unassigned', 'Blu-Ray', 'DVD', 'IPTV VOD', etc.
- Watch Folders:** A list of folders and their associated outputs, including paths like '\\netapp\watch\_folder\testwat...'. A callout points to this section: "Create and manage all watch folders associated with Armada".
- Customers:** A table listing customer names and account numbers.
- Monitors:** A table showing node details. A callout points to this section: "Monitor & Manage Node Activity, Job Queue, Active Jobs, Completed Jobs, & all System Events from a simple, reconfigurable table."

Host Name	Address	Processors	Current Jobs	System Performance	Uptime
dr-virtual	192.168.3.25:8061	1	1	96%	66:35:09
qs3	192.168.3.23:8061	4	1	84%	66:29:02
CaryNode	192.168.1.81:8061	4	1	82%	2:29:19
SMEERS400	192.168.1.62:8061	4	0	9%	93:41:56
dcapeletti-pc	192.168.1.23:8061	1	0	2%	1:17:28
fathoms400node	192.168.1.86:8061	4	0	1%	65:45:11
HP27253300762	192.168.1.24:8061	8	2	0%	66:20:02
Octal8400	192.168.1.65:8061	8	0	0%	0:00:00
PJACOBSON-PC	192.168.1.132:8061	4	0	0%	0:00:00
QA1	192.168.3.25:8061	4	0	0%	03:53:50
QALAB-PC2	192.168.1.65:8061	4	1	0%	65:58:43
Raleigh2U	192.168.1.82:8061	4	1	0%	2:00:35
- Grid Summary:** A visual overview of node status. A callout points to this section: "Summary & Status of Nodes - Green = available & accepting jobs, Yellow = Unavailable - node is in scheduled offline period, Red = failed - no communication with node, Gray = Manual Offline".
- Grid Performance:** A gauge showing overall grid performance at 29% and total grid capacity of 73 Gbit. A callout points to this section: "Grid Performance - like the RPM's on your car".
- Events:** A list of recent system events, such as "Job 'WRAL-news5.mpg' completed" and "Job 'WRAL-news5.mpg' started". A callout points to this section: "Recent Events displayed for quick reference".

Create and manage all watch folders associated with Armada

Add & assign customers to jobs & watch folders to help track work

Summary & Status of Nodes - Green = available & accepting jobs, Yellow = Unavailable - node is in scheduled offline period, Red = failed - no communication with node, Gray = Manual Offline

Recent Events displayed for quick reference



### Armada Manager



### Armada Grid



### Shared Storage



Ethernet or  
Fibre Channel

# ARMADA ARCHITECTURE

MANAGEMENT

ADMINISTRATION

Pre-Encoding

Encoding

Post Encoding

Alarms and Notification

Defined User Level

Reporting and Logging

Capture

Analysis

Template  
Creation &  
Management

Distributed  
Encoding

Quality  
Control

Content  
Encryption

PRE - ENCODING

ENCODING

POST ENCODING

File  
Verification

Meta data  
Extraction

Job  
Scheduling  
& Priority

Load  
Balancing &  
Node  
Management

Packaging

Publishing