



## **File-based Quality Control System**

a scalable software solution for automated verification of media files and audio, video and metadata defects identification

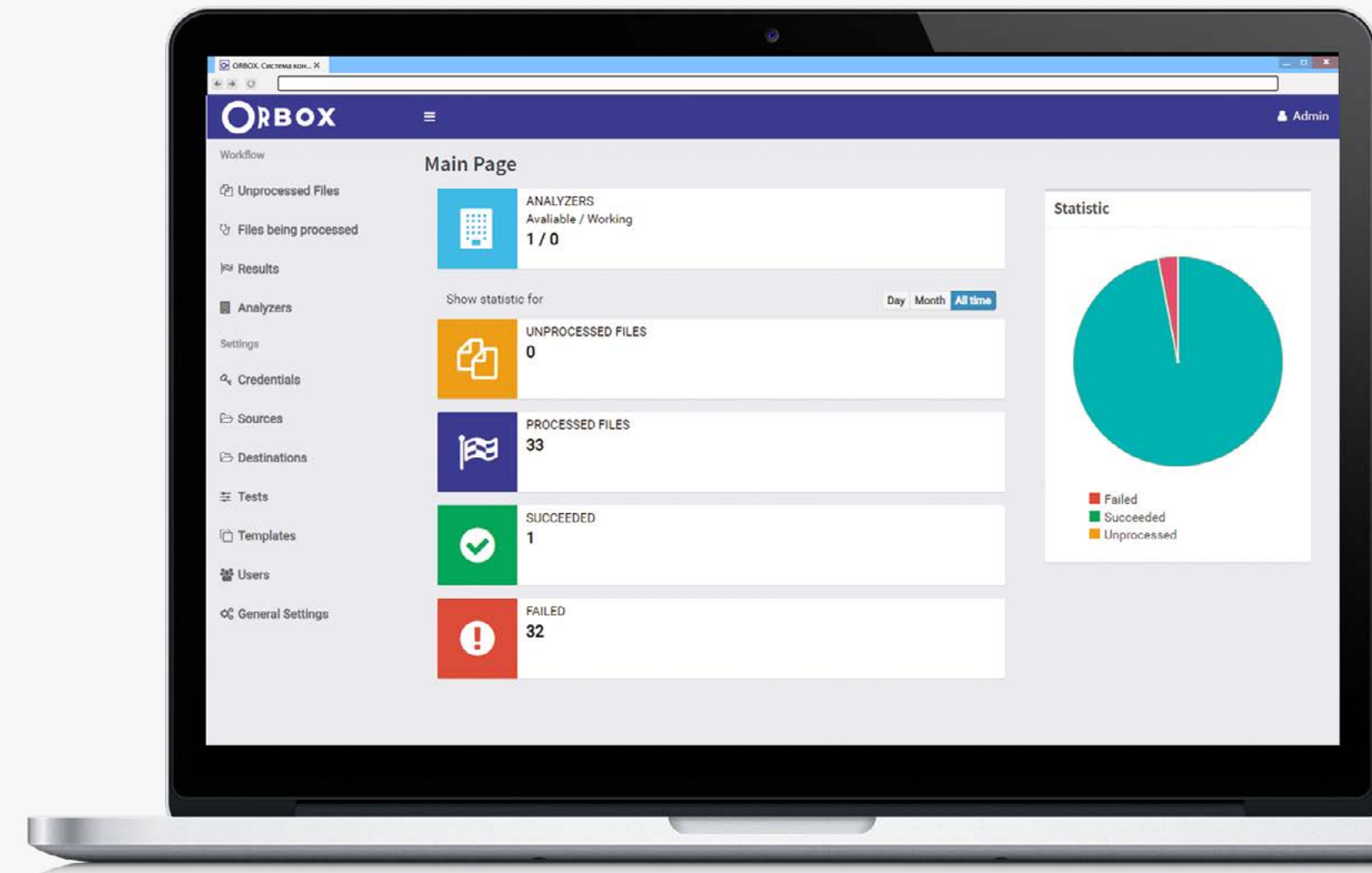
# Our Solution



## ORBOX. Automated media file-based QC

Software solution for automated verification of media file compliance with the following technical parameters of broadcasters, media providers and content producers:

- Audio
- Video
- Metadata



# Key Features

- A wide range of checks for file-based content quality verification
- Configurable test templates for specific media formats and sources
- Simple and descriptive reports, media player to playback and edit any defected fragment
- Workspaces for various access groups
- Audio analysis and loudness correction
- Easy to scale by adding analysis servers
- Rest API
- Hot Redundancy
- AI-enabled video tests
- Archive of Defects

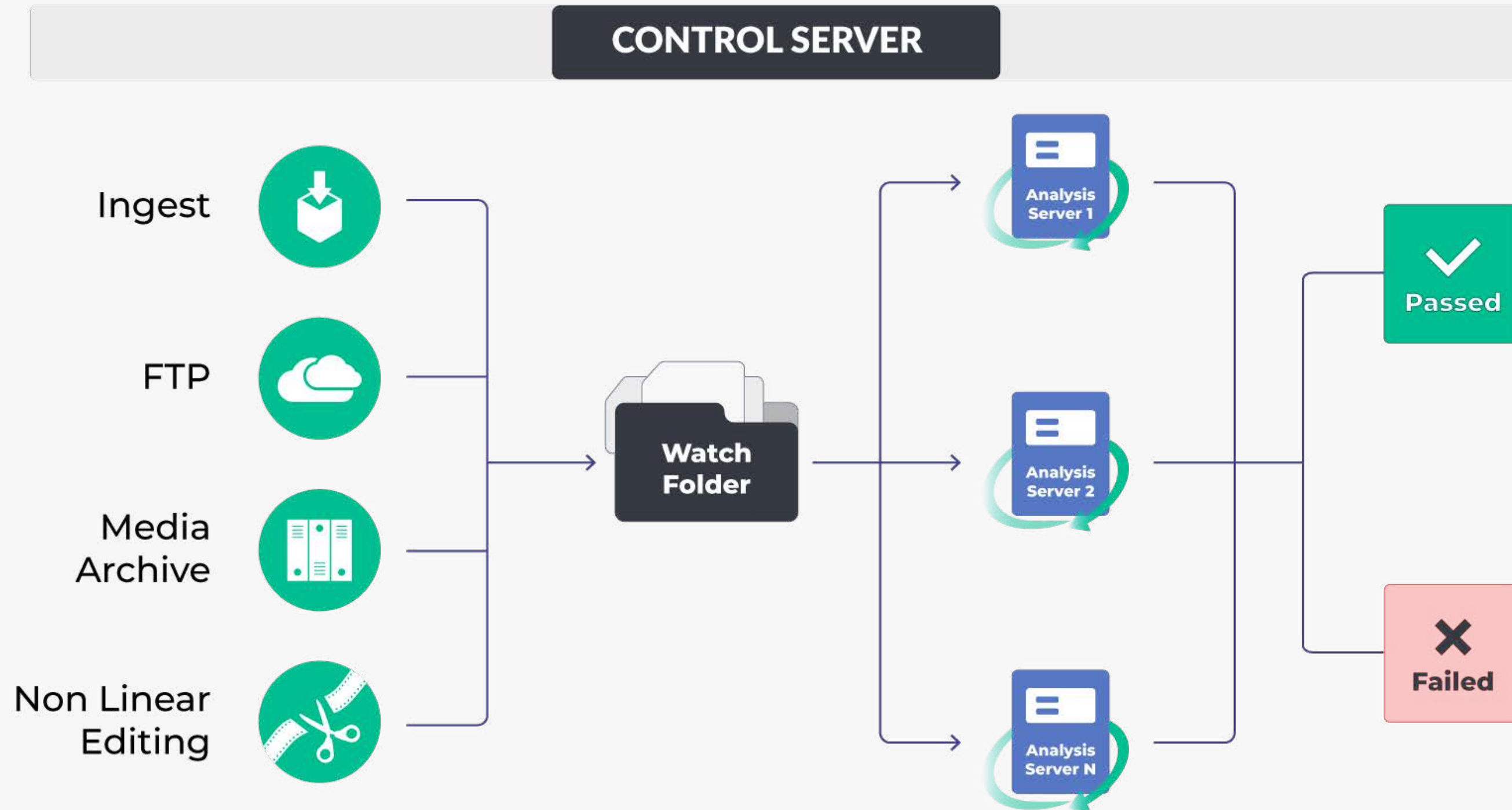


**Linux**<sup>TM</sup>  
Fully Linux-based

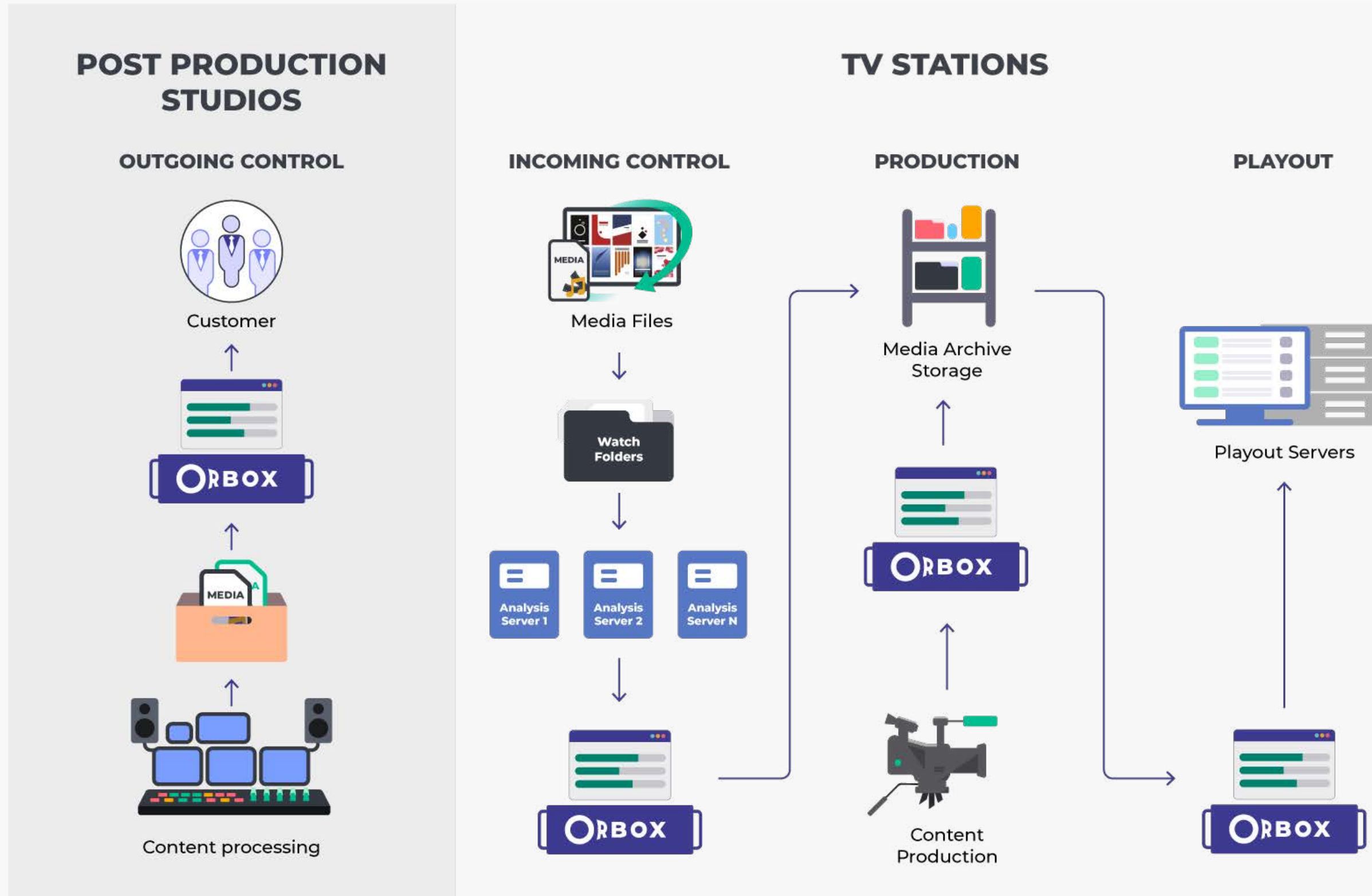
**4x** times  
faster than  
real time\*

\*Speed of HD content analysis with a full set of tests

# How It Works?



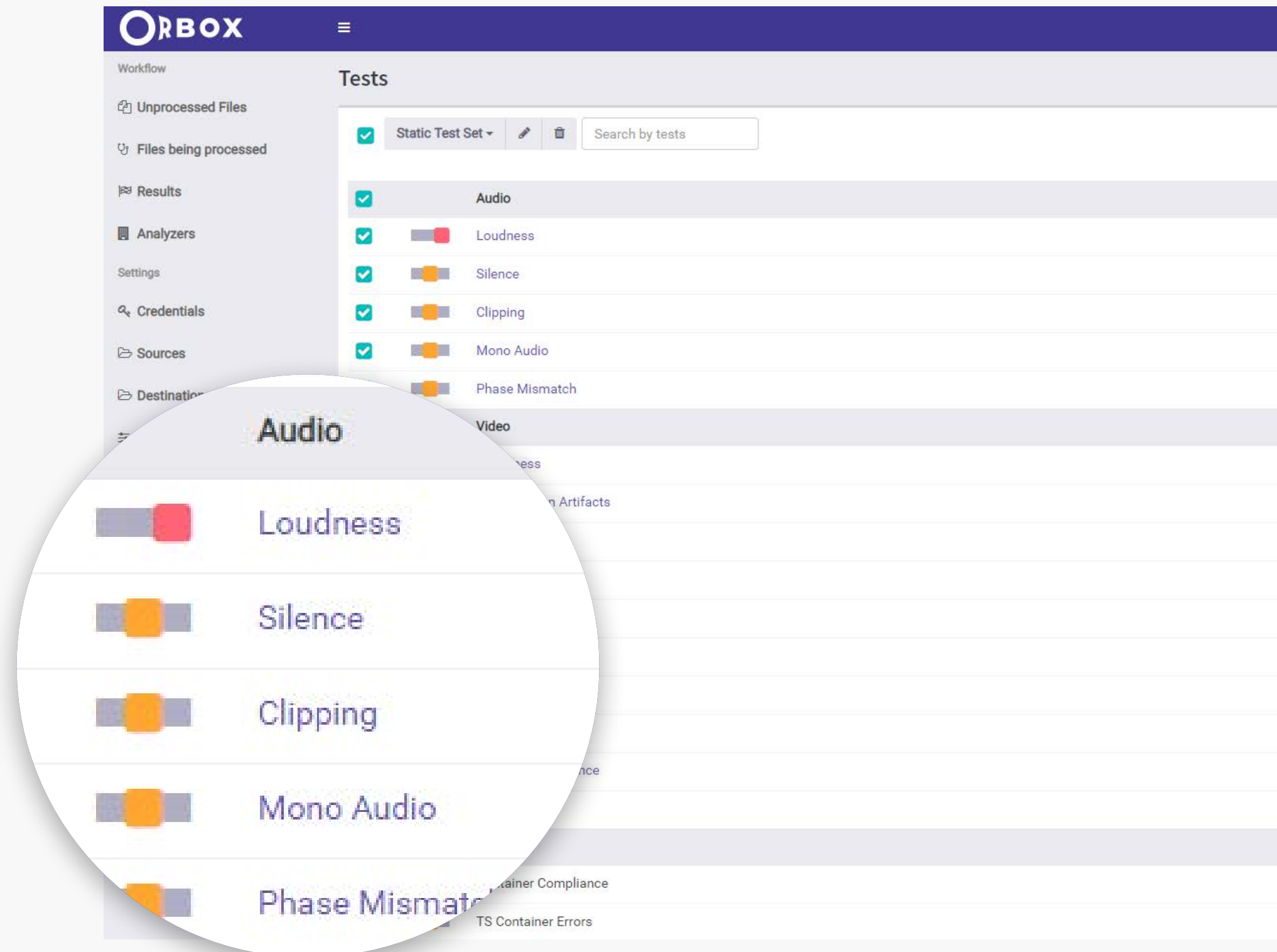
# Workflows



# Test Configuration



- Each test can be manually configured or default parameters can be applied
- The system enables to select critical tests.  
If a critical test is failed, further process of file verification is stopped
- 3 levels:
  - Low
  - Normal
  - Critical
- Import and export of data



# AI-enabled Video Checks

A new test for identifying flash frames using machine learning (ML) algorithms is implemented in the system.

AI-enabled Test  
VS  
Standard Algorithm



**20% more\***  
detected defects

**7 times less false  
positive results**



\*according to the Tecom Group's research

# Workflow Templates



- Setting QC rules to check multi-formatted files coming from different sources
- Routing: after analysis files can be routed to different folders
- The following parameters can be set:
  - Video and audio formats
  - Video resolution
  - Source and destination folders

A screenshot of the ORBOX web application interface for configuring a workflow template. The interface has a dark blue header with the ORBOX logo and a hamburger menu. A left sidebar contains a 'Workflow' section with icons for 'Unprocessed Files', 'Files being processed', 'Results', and 'Analyzers', followed by a 'Settings' section with icons for 'Credentials', 'Sources', and 'Destinations'. The main content area is titled 'Template' and contains a 'Template parameters' section with a 'Name' field and a 'Type' dropdown menu set to 'Video Files'. Below this is a 'Test Set' section. A large, semi-transparent circular overlay is positioned in the foreground, containing the text 'Containers' and 'Specify video containers as a template criteria.' with a text input field containing 'Any container'. Below this, the text 'Video Codecs' and 'Specify video codecs as a template criteria.' is visible, followed by a text input field containing 'any codec'.



## Watching QC Results



- Basic and detailed PDF, HTML, JSON, XML reports
- Media players to watch and edit QC results:
  - Windows player  
(including video output on SDI display)

Workflow

Unprocessed Files

Files being processed

Results

Analyzers

Settings

Credentials

Sources

Destinations

Tests

Task Results

Task Info

Full path to the file	\\192.168.115.172\test-files\VideoTests_Passed_2.mov
File analysis result	<span>✔</span> Succeeded
Video Duration	00:01:00.00 / 25 fps
Container	MOV QuickTime
Video Codec	DV
Video Definition	720 x 576
Audio Codecs	PCM
Audio Tracks Count	1
Applied Template	MOV
Started at	28.05.2019 12:58:04
Finished at	28.05.2019 12:58:10

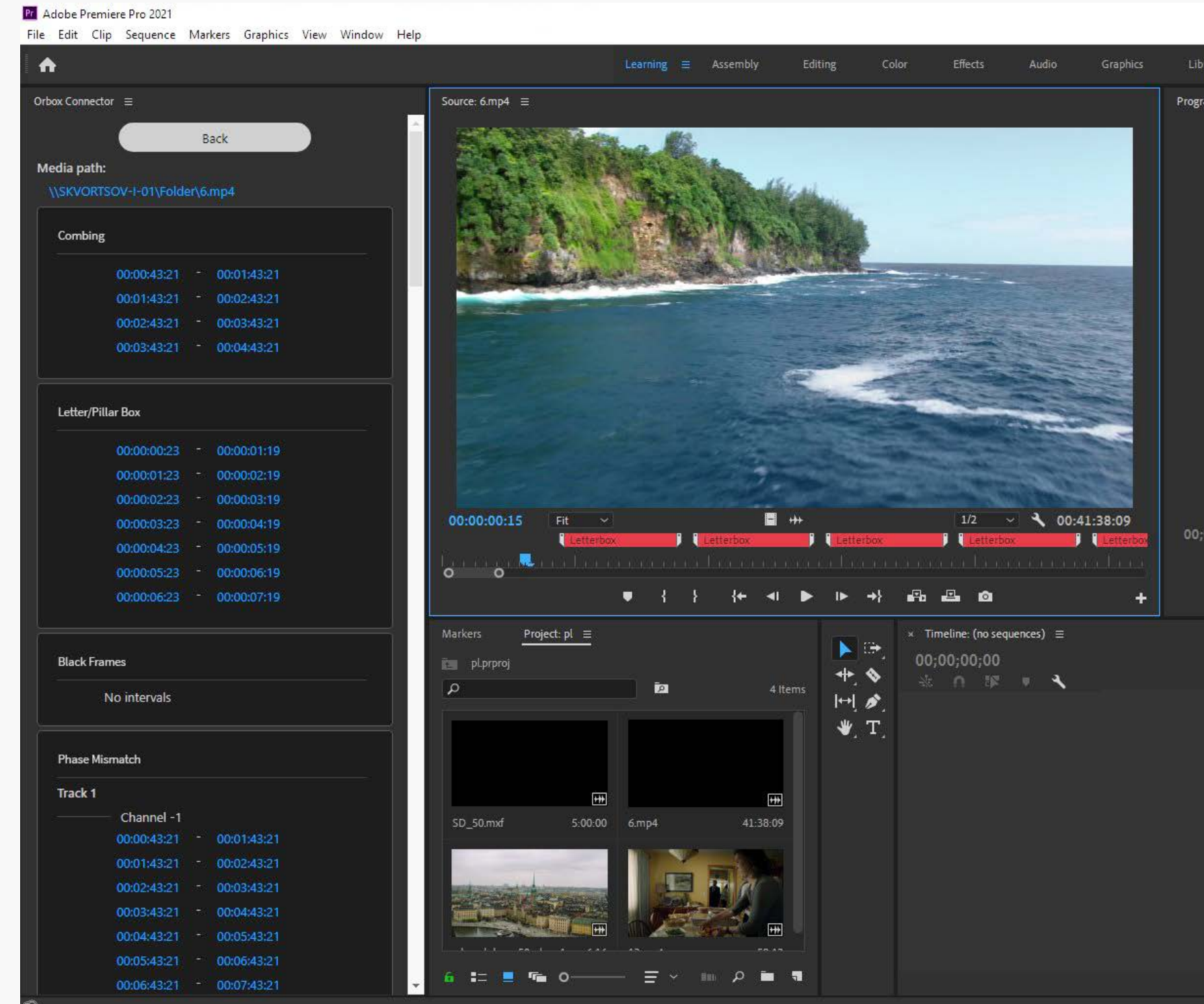
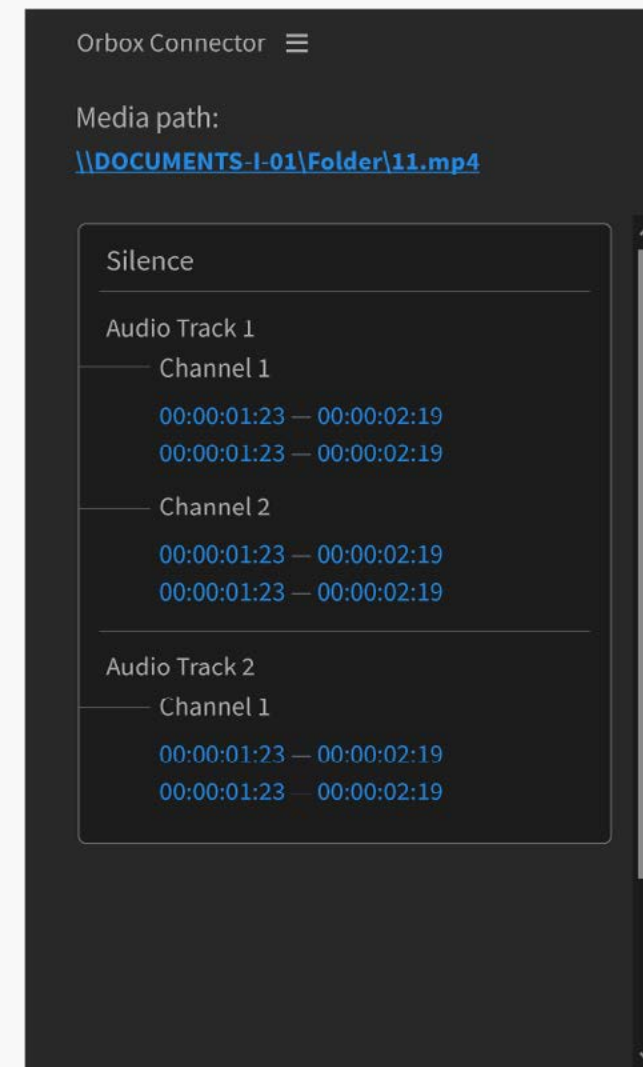
The image shows a software interface for video analysis. On the left is a sidebar with a list of analysis categories, each with a right-pointing arrow. The categories are: Macroblocking detection, Black frame detection, Letterboxing detection, CBG chart detection, Flash frames detection, Interlacing detection (which is highlighted with a blue background and a checkmark icon), Freeze frame detection, Saturation level check, and Black and white balance check. Below each category is a list of time ranges. For 'Interlacing detection', the list includes: 00:00:00:03 - 00:00:00:10, 00:00:20:43 - 00:22:00:13\*, 00:01:01:32 - 01:02:00:00, 00:01:01:32 - 01:02:00:00, 00:01:01:32 - 01:02:00:00, 00:00:00:03 - 00:00:00:10, 00:00:20:43 - 00:22:00:13, 00:01:01:32 - 01:02:00:00\*, 00:01:01:32 - 01:02:00:00, 00:00:00:03 - 00:00:00:10, 00:00:20:43 - 00:22:00:13, 00:01:01:32 - 01:02:00:00, 00:01:01:32 - 01:02:00:00\*, 00:01:01:32 - 01:02:00:00, 00:01:01:32 - 01:02:00:00. The main area of the player shows a video frame of a concert with a large white play button in the center. At the bottom, there is a progress bar, a time display showing '00:00:10:03 / 00:01:02:00', a set of playback controls (play, stop, previous, next, full screen), a volume slider, and a label 'Audio track 01'.

Res
✓ S
✓ S
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# Plugin for Adobe Premiere Pro



Plugin for Adobe Premiere Pro enables  
to watch the QC results right within  
the video editing program interface



# Loudness Control

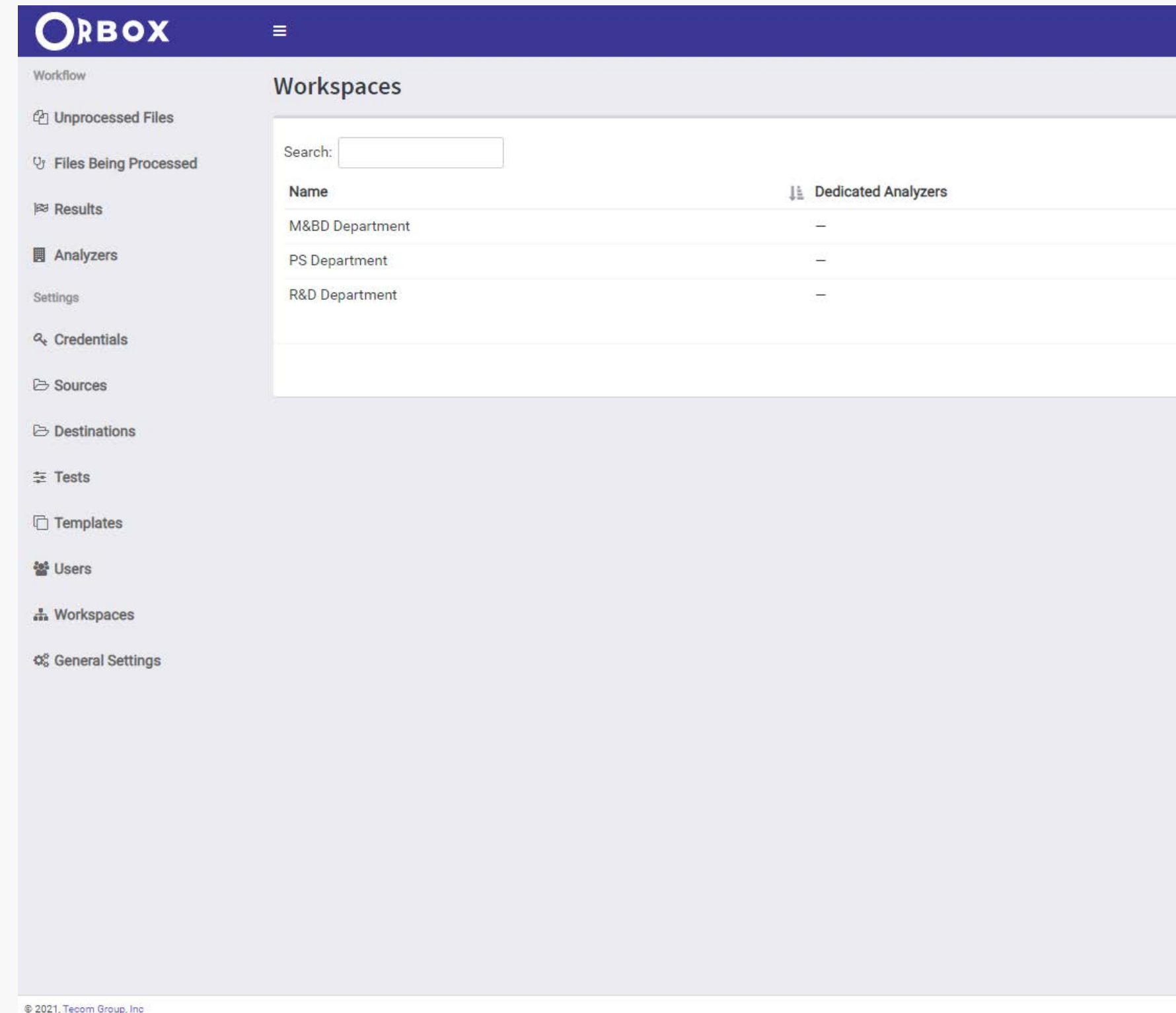
- Audio analysis and loudness correction in compliance with EBU R128 and other industry standards
- Channel mapping



# Workspaces

## One system for several separate work environments

- A single control server can be used by different groups of users (for example, employees of different departments)
- Each group of users has its own set of settings within the same control server, its own test settings, sources, destinations and task results
- Test sets can be copied from one workspace to another



The screenshot displays the ORBOX Workspaces management interface. On the left is a sidebar menu with options: Workflow, Unprocessed Files, Files Being Processed, Results, Analyzers, Settings, Credentials, Sources, Destinations, Tests, Templates, Users, Workspaces, and General Settings. The main panel is titled 'Workspaces' and features a search bar and a table. The table has two columns: 'Name' and 'Dedicated Analyzers'. It lists three workspaces: 'M&BD Department', 'PS Department', and 'R&D Department', each with a dash in the 'Dedicated Analyzers' column.

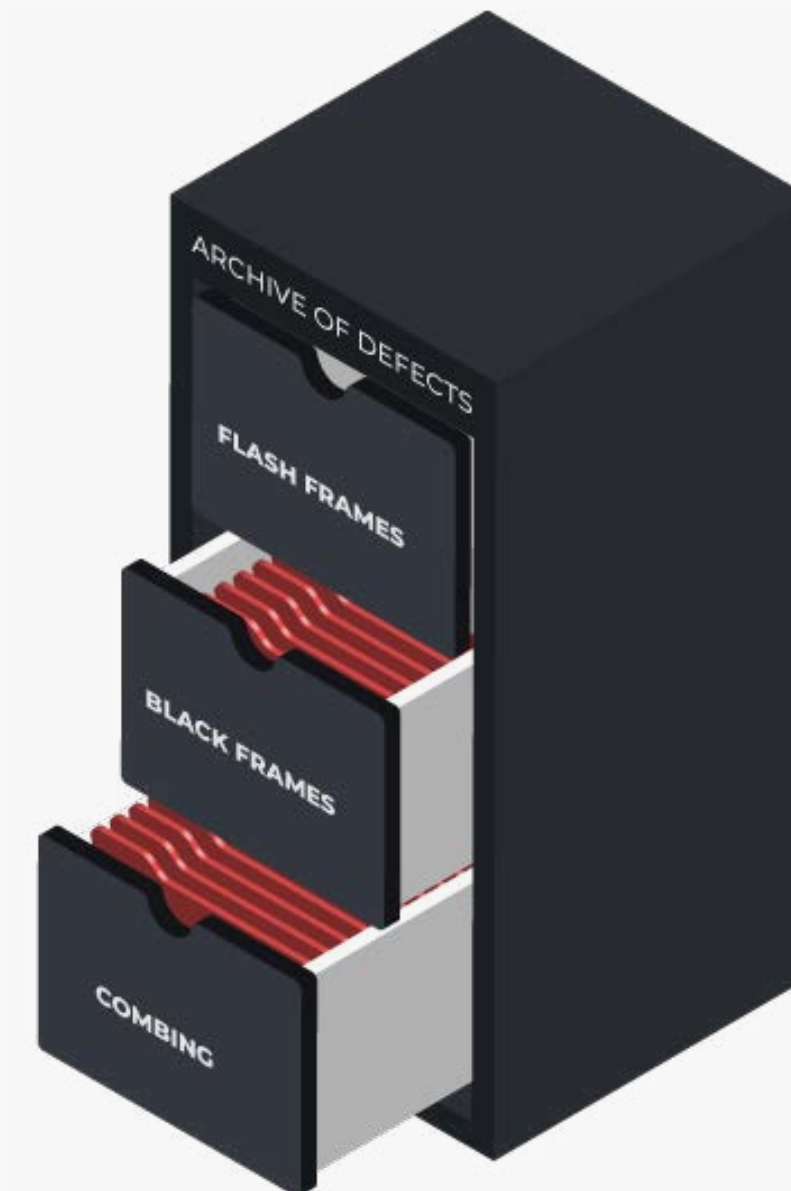
Name	Dedicated Analyzers
M&BD Department	—
PS Department	—
R&D Department	—

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# Archive of Defects

The Archive serves as a collection of all detected defects and provides:

- training materials to educate the QC personnel
- fast and easy interaction with the ORBOX support service

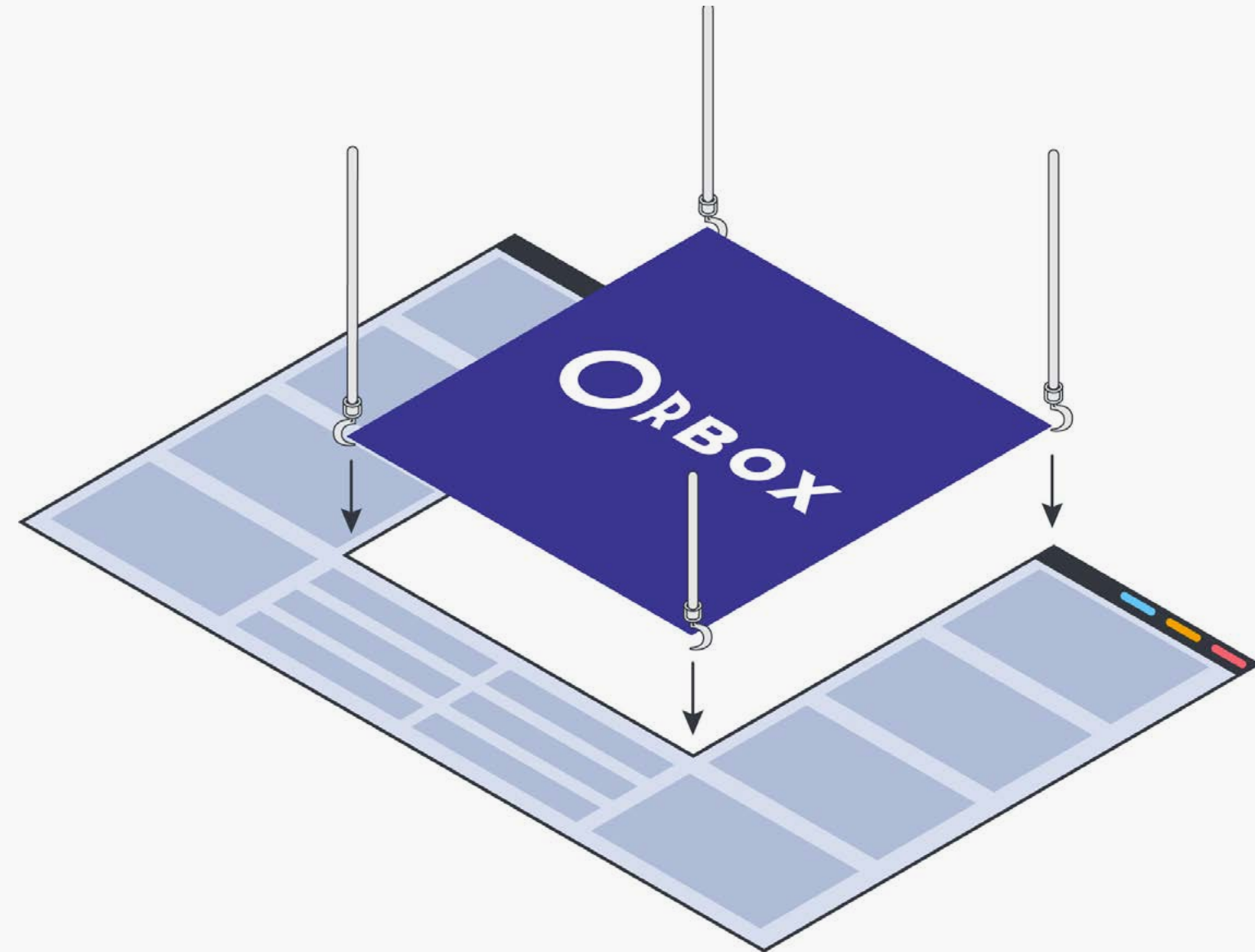




# REST API



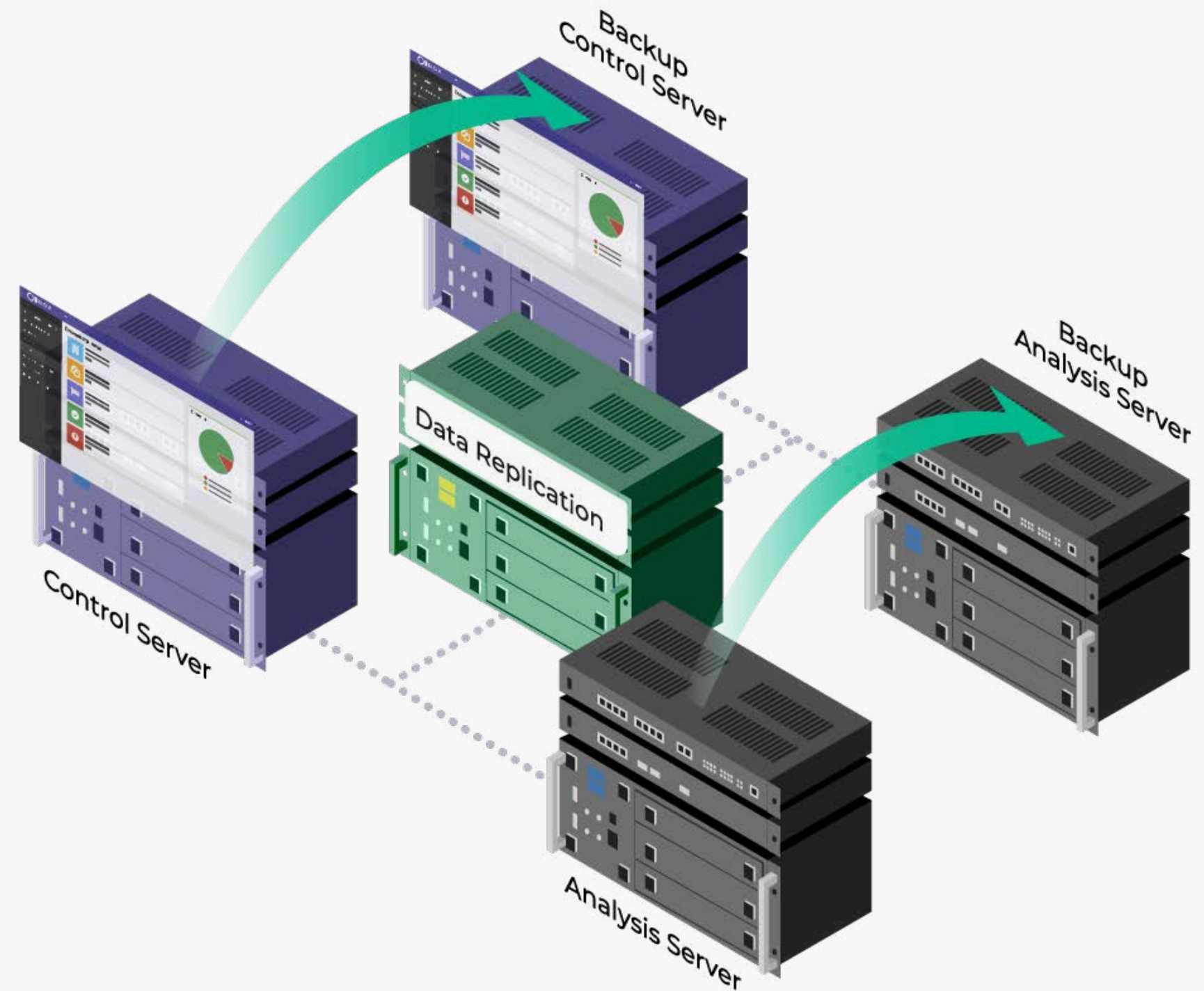
Software integration with  
any third-party system



# System Redundancy



Automatic hot redundancy in case  
any server goes down



# Scalability and Licensing



- The system can be easily expanded by adding new analysis servers
- Control server is responsible for load balancing between analysis servers, as well as providing reports via web interface

The screenshot displays the ORBOX web interface. On the left is a sidebar menu with options: Workflow, Unprocessed Files, Files being processed, Results, Analyzers (selected), Settings, Credentials, Sources, Destinations, Tests, and Test Results. The main content area is titled 'Analyzers' and includes a search bar. Below the search bar is a table with the following data:

Server Name	IP Address	CPU Usage	Memory usage
qc-analyze-2	190.000.333.333	<div><div></div></div>	<div><div></div></div>
qc-analyze-3	190.000.333.333	<div><div></div></div>	<div><div></div></div>
qc-analyze-4	190.000.333.333	<div><div></div></div>	<div><div></div></div>

A circular callout highlights the search functionality. It shows the search bar with the text 'Search:' and a list of suggestions: 'qc-analyze-2', 'qc-analyze-3', and 'qc-analyze-4'.



# ORBOX Tests

## Container Metadata

- Container Integrity
- PS Container Errors
- TS Container Errors
- Container Format
- MXF Parameters
- Format Profile

## Audio Metadata

- Audio Bitrate
- Audio Channel Count (in file)
- Audio Channel Count (in track)
- Audio Sampling Rate
- Audio Bit Depth
- Audio Codec
- Audio Language Tags
- Channels Layout

## Video Metadata

- Frame Size
- Pixel Aspect Ratio
- Frame Rate
- Video Bitrate
- Real Video Bitrate
- Field Order
- Video Bit Depth
- Video Codec
- Video Duration
- Video Bitrate Type
- Bit Depth Matching
- Display Aspect Ratio
- Scanning Type
- Video Codec Profile and Level
- Video Tracks Count
- Last Frame Duration

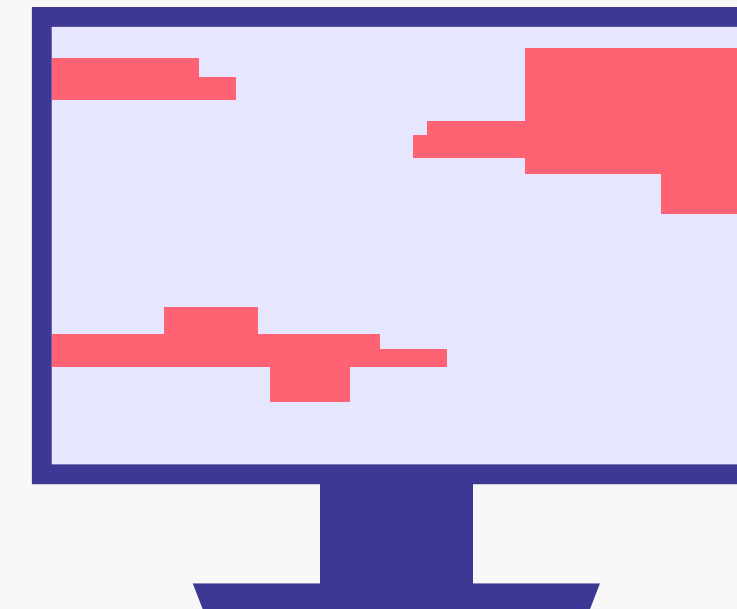
## Color Coding Metadata

- Chroma Subsampling
- Colour Range
- Colour Primaries
- Transfer Characteristics
- Matrix Coefficients

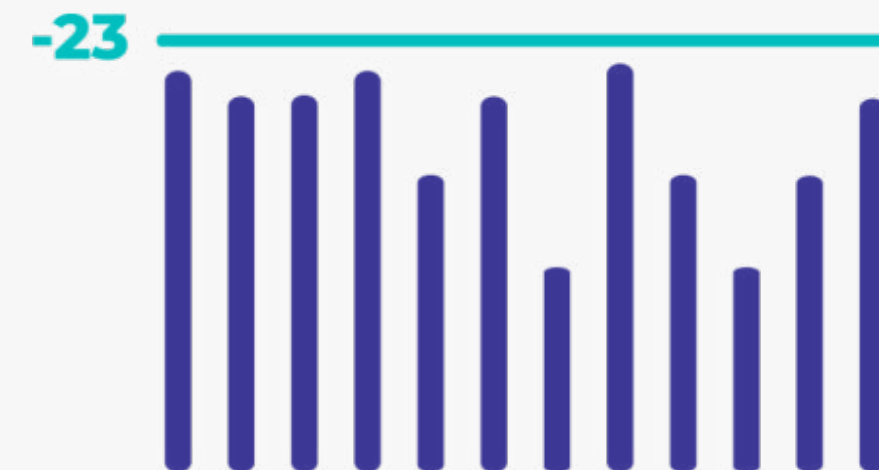
## Other Metadata

- Audio/Video Duration Match
- GOP Structure
- Picture Coding Type
- Time Code Start Value
- Continuity of Timecodes
- Tracks Configuration
- Title Correctness

- Data Loss Artifacts
- Data Loss Macroblock
- Compression Artifacts
- Noise
- Freeze
- Black Frames
- Combing
- Video Decoding Errors
- Gamut Errors
- Color Components Level
- Upconversion Detection
- Test Pattern
- Constant Color Frames
- Black Bars
- Black Bars Changing Size
- Dropouts
- Field Order
- Black/White Level
- Vectorscope
- Image Quality Score
- Short Shot
- Short Shot Using ML



- Integrated Loudness and Normalization
- Loudness Parameters
- Silence
- Digital Clipping
- Mono/Stereo Mismatch
- Phase Reversal
- Test Tone
- No Signal



# VOD Verification



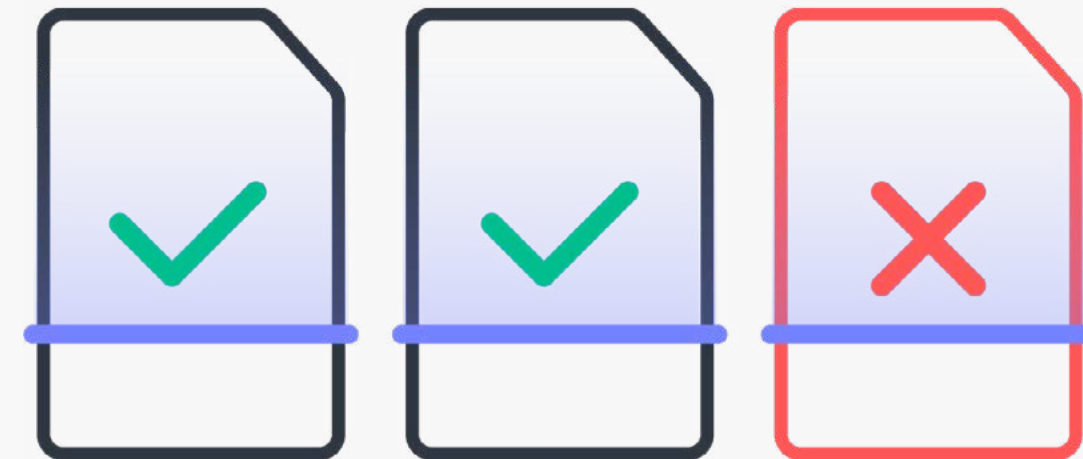
- The quality of media content is priority #1 for OTT service providers
- The system detects VOD content defects before its delivery to subscribers
- VOD content verification is based on video, audio and metadata parameters at any point of origination and content delivery to broadcast servers
- Support for HLS rfc8216bis-11 version 4



# VOD Tests



- Segments Availability
- Subtitles and Closed Captions
- PTS/DTS Continuity



# HDR Tests



- HDR Brightness Conversion Systems
- HDR Mastering Display Luminance
- HDR Display Primaries
- HDR Chromaticity Of White Point
- Maximum Content Light Level (MaxCLL)
- Maximum Frame-Average Light Level (MaxFALL)

## Standards:

SMPTE ST-2094, BT.2100, ST-2084



# Supported Formats



## Containers

- AVI
- MXF
- MP4
- MOV
- TS
- MPG
- M2T/M2TS
- M2V

## Video Codecs

- MPEG2
- MPEG4
- DV
- H.264
- H.265
- PRORES
- DNxHD
- MJPEG
- XAVC
- JPEG2000

## Audio Codecs

- AAC
- AC-3
- Alaw
- MPEG Audio
- PCM

# System Requirements



The system consists of the analysis server and the control server:

## Control server

- Processor: Intel Core i5
- 16 GB RAM
- 300 GB HDD
- OS: DEBIAN 11
- Ethernet Adapter 1GB (x1)

## Analysis server

- Processor: Xeon Silver 4210 (x2)
- 64 GB DDR4 RAM
- 300GB HDD (RAID1)
- OS: DEBIAN 11
- Ethernet Adapter 10GB (x1)

Servers can be virtual and should have the same technical characteristics as “physical” ones



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