The role of VRIF in the VR360 Ecosystem

www.vr-if.org

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Rob Koenen

Principal, TNO

Founder, Tiledmedia

President, VRIF

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Source:
HypeVR

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BT Sport

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Where are we headed?

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- Full immersion - “six degrees of freedom”
- Real and computer-generated – and indistinguishable

- Immersive story-telling
- Enjoy an event as if you were there
- Enjoy it with friends

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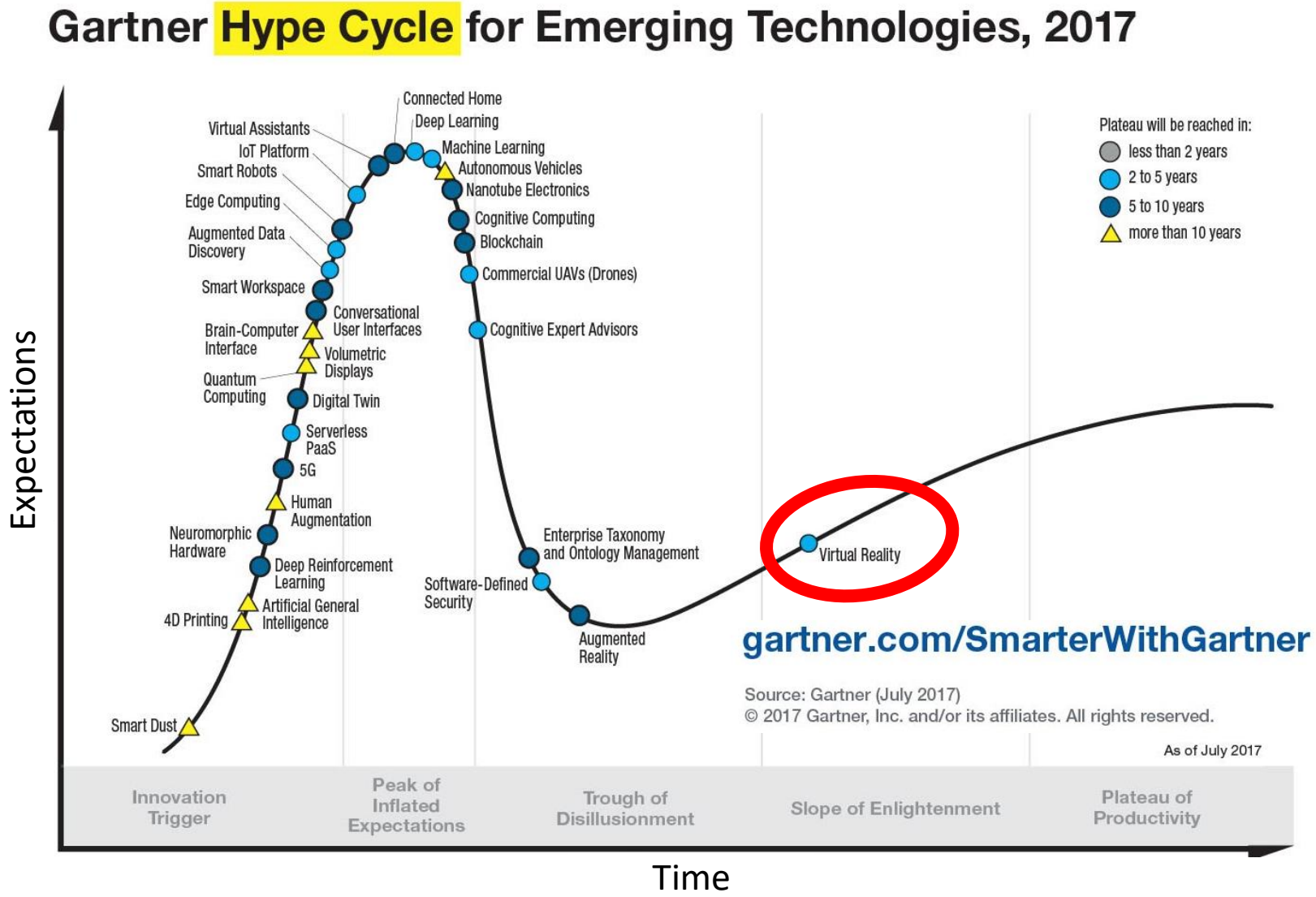
Where are we today?



Where are we today?

- First steps: VR360
- Video: Mono or Stereo
- Audio: Stereo or Spatial
- Very low resolution
- Limited (head) motion
- Large HMDs

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What is required

- Attractive user experience
- Great content
- Easy to use
- No side-effects
- Affordable
  - for consumers
  - for providers
- Interoperable

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Mission VR Industry Forum

To further the widespread availability of high quality audiovisual VR experiences, for the benefit of consumers

- Non-profit organisation established during CES 2017, after a year of informal meetings

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Who Are We?

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SONY PICTURES
sky
verizon
HUAWEI
NOKIA
technicolor
Fraunhofer
QUALCOMM
intel
DOLBY
TILEDMEDIA
dts
castLabs
ERICSSON
harmonic
Cateme
ARRIS
ORAH
Whistling Woods International
INSTITUTE OF FILM, COMMUNICATION & MEDIA ARTS
CableLabs
movie labs
EBU
DTG
BAYLOR UNIVERSITY
Akamai
b com
TEXEL
NAGRA KUDELSKI
brightcove
PILOT
NAVIGATING BROADCASTING'S FUTURE
NGCODEC
NEXT GENERATION VIDEO COMPRESSION
Pink Unicorns From Mars
TNO
viaccess·orca
Ittiam
cinova
BITMOVIN
vantrix
irdeto
inside secure

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Why did we form VRIF?

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- VR will thrive if we can **accelerate the adoption** by removing hurdles.
- VRIF aims to **bootstrap an industry** that will allow all of us, and consumers, to benefit.
- A formal organization provides an **efficient framework** with:
  - well-established **rules** and **procedures**
  - the ability to **fund relevant activities**
  - a structure to conduct **technical** and **communication activities**
  - a context that respects **competition law**
  - the possibility to gain industry-wide **recognition** and **credibility**

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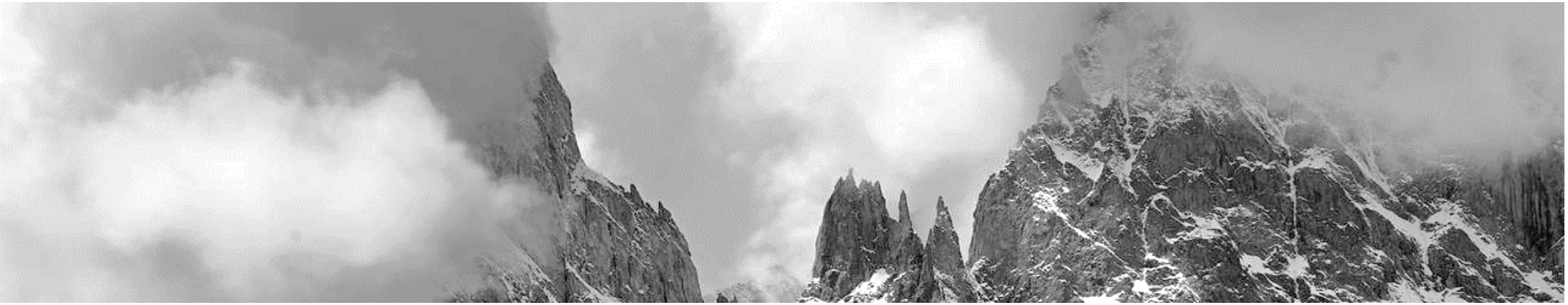

GOALS & PRINCIPLES

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Goal – Creating a Market for 360VR

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For consumers:

- **Make 360VR a high-quality, immersive, cross-platform experience**

For content producers & service providers:

- **Broaden reach and reduce cost caused by format proliferation (cost of production, distribution, etc.)**

For device makers:

- **Ensure a wealthy, premium quality content pipeline**

For advertisers:

- **Drive the creation of a broad, unique & innovative sales channel**

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Principles

- Advocating voluntary **industry consensus** around common technical standards for the end-to-end VR ecosystem, from creation to delivery and consumption
- Advocating the creation and adoption of **interoperable standards** (VRIF will not develop standards itself); promoting the use of common profiles across the industry, and promoting and **demonstrating interoperability**
- Developing **voluntary guidelines** that describe best practices, to ensure high quality VR experiences

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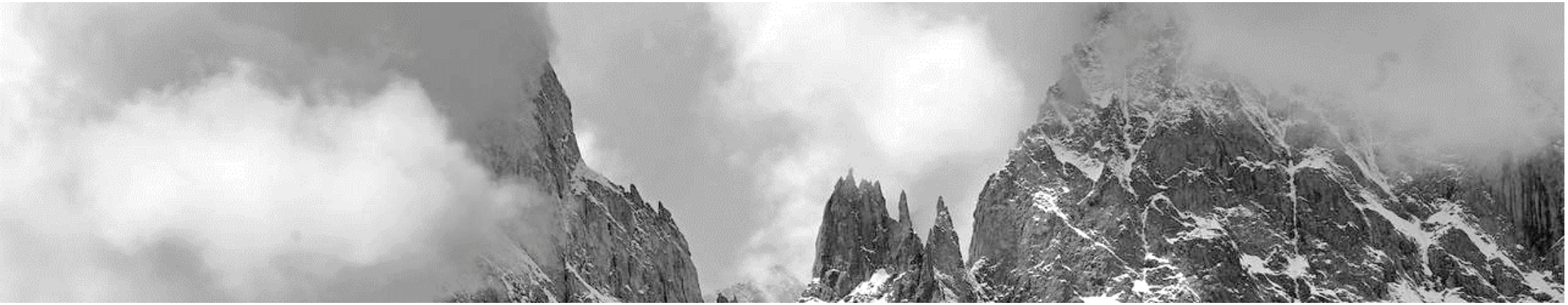

HOW WE WORK

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How we work

- **Build on available specifications and standards**
  - Don’t do standards ourselves
  - Recommend selections were needed (specs may provide many options)
- **Guidelines that go beyond standardization**
  - Production, Human Factors, etc.
- **Interoperability tests and demos**
  - Demonstrate a cross-platform content ecosystem
- **Advocacy of interoperable solutions and standards**

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Organizational Structure

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Board

Requirements WG

Guidelines WG

- Production TF
- Security TF
- Distribution TF

Comms WG

Liaison WG

E2E Interop WG

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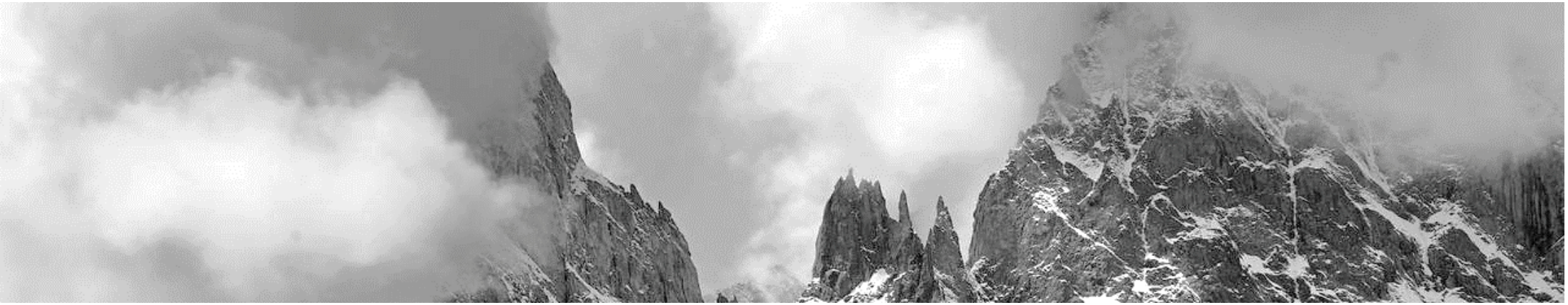

DELIVERABLES

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Deliverables

- Publish **Guidelines** (Goal: CES 2018)
  - Production
  - Distribution
  - Security
  - Creation of Interoperable points
- **Draft Guidelines** were published for Industry Review at IBC Sep ‘’17
- **Lexicon** for common terminology available at **www.vr-if.org**

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Organization

- Guidelines Organized by Vertical
- Currently, one Vertical: Download or Streaming of VR360 Content
- Per Vertical:
  - Use Case(s)
  - Technical Enablers (read: specifications)
  - Guidelines for Services Providers
  - Guidelines for Platform Developers
  - Guidelines for App Developers
- Live distribution added in 2018

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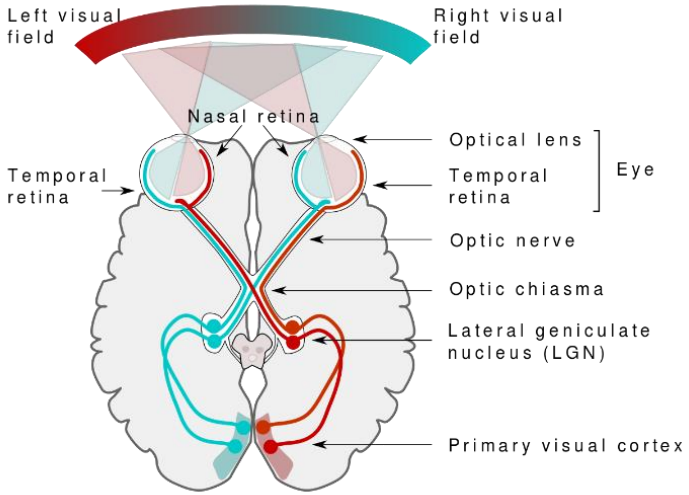
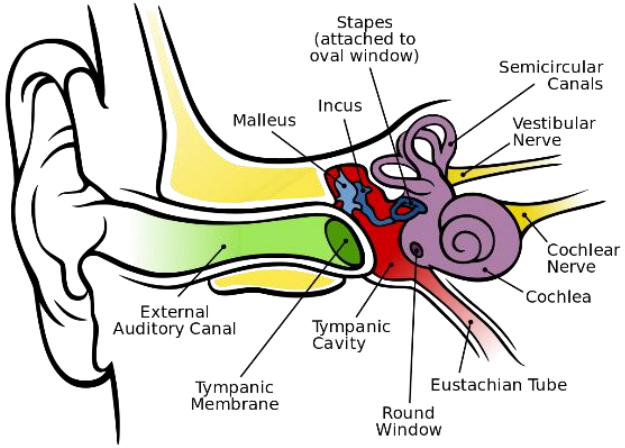
Human Factors

- Human Factors that impact the VR experience
  - Physiological (eye/human visual system, ear/human auditory system)
  - Physio-cognitive (motion sickness, sensory conflicts)
  - Psycho-cognitive (presence, realism of immersion, interaction)
  - Psycho-social (violence, addictions, etc.)





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Production

- How to produce immersive quality content
- Technical recommendations (capture, recording, resolution, immersive audio, storage and exchange formats, frame rates …)
- Incorporating results of human factor studies (cuts, motion, etc.)
- Content Exchange Metadata

- Started from SKY's "Technical Guidelines"

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Distribution

- Based on “OTT Download and Streaming” cases
- Guidance and recommendations to implement VR video and audio profiles from MPEG OMAF (“Omnidirectional MediA Format”)
  - Viewport Independent media profile → Stream Everything
  - Viewport Dependent media profile → Focus on Viewport
  - 3D Audio media profile
- Configuration of packing, projection and supporting metadata
- Use of Adaptation Sets for MPEG DASH based streaming

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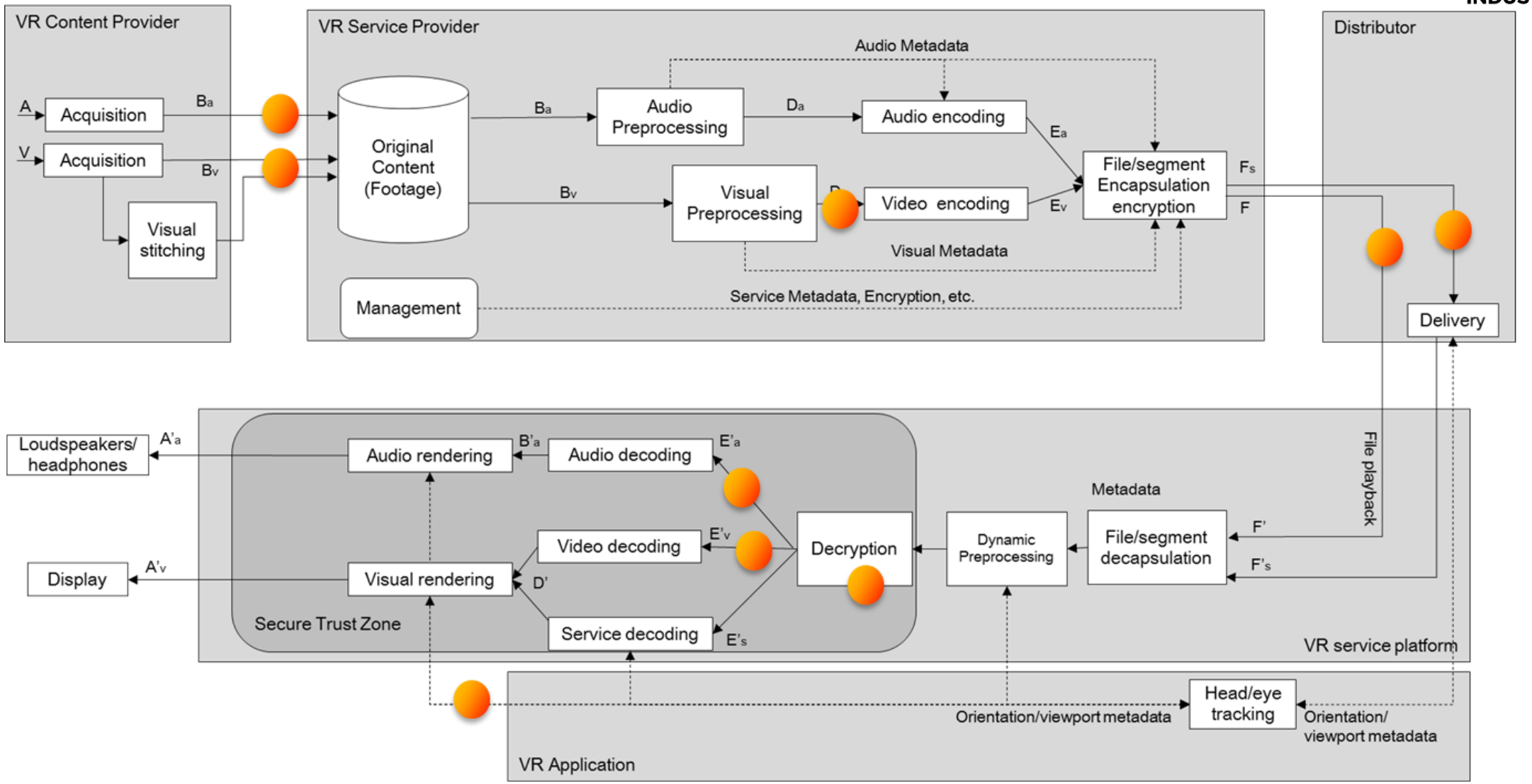
Interoperability Points



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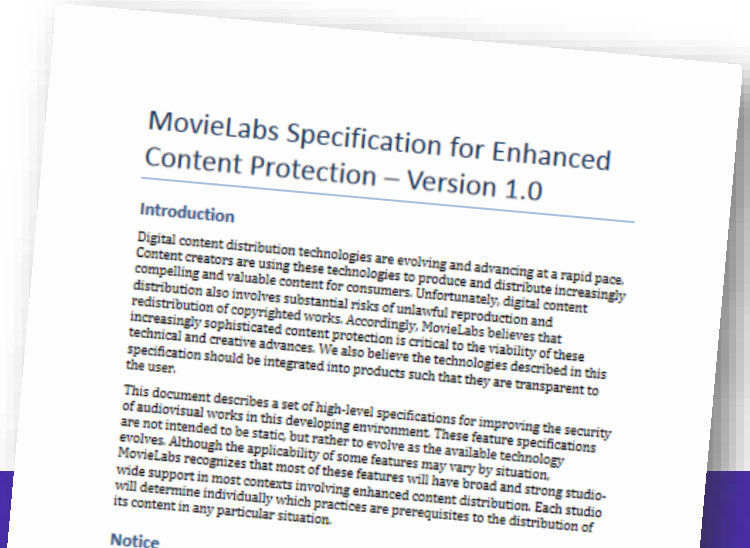
Security

- High quality VR productions can be very expensive
- Started from MovieLabs Enhanced Content Protection spec;
- Clear challenges:
  - Securing a pipeline that includes the rendering step
  - Encryption in tiled VR streaming system
- More challenges:
  - securing privacy-sensitive data,
  - preventing against “nausea attacks”



MovieLabs Specification for Enhanced Content Protection – Version 1.0

Introduction

Digital content distribution technologies are evolving and advancing at a rapid pace. Content creators are using these technologies to produce and distribute increasingly compelling and valuable content for consumers. Unfortunately, digital content distribution also involves substantial risks of unlawful reproduction and redistribution of copyrighted works. Accordingly, MovieLabs believes that increasingly sophisticated content protection is critical to the viability of these technical and creative advances. We also believe the technologies described in this specification should be integrated into products such that they are transparent to the user.

This document describes a set of high-level specifications for improving the security of audiovisual works in this developing environment. These feature specifications are not intended to be static, but rather to evolve as the available technology evolves. Although the applicability of some features may vary by situation, MovieLabs recognizes that most of these features will have broad and strong studio-wide support in most contexts involving enhanced content distribution. Each studio will determine individually which practices are prerequisites to the distribution of its content in any particular situation.

Notice

NEXT STEPS

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Test Vectors

- Development of test vectors that can be used to validate implementations
- 360° video content is being obtained. Test vector development work to begin immediately

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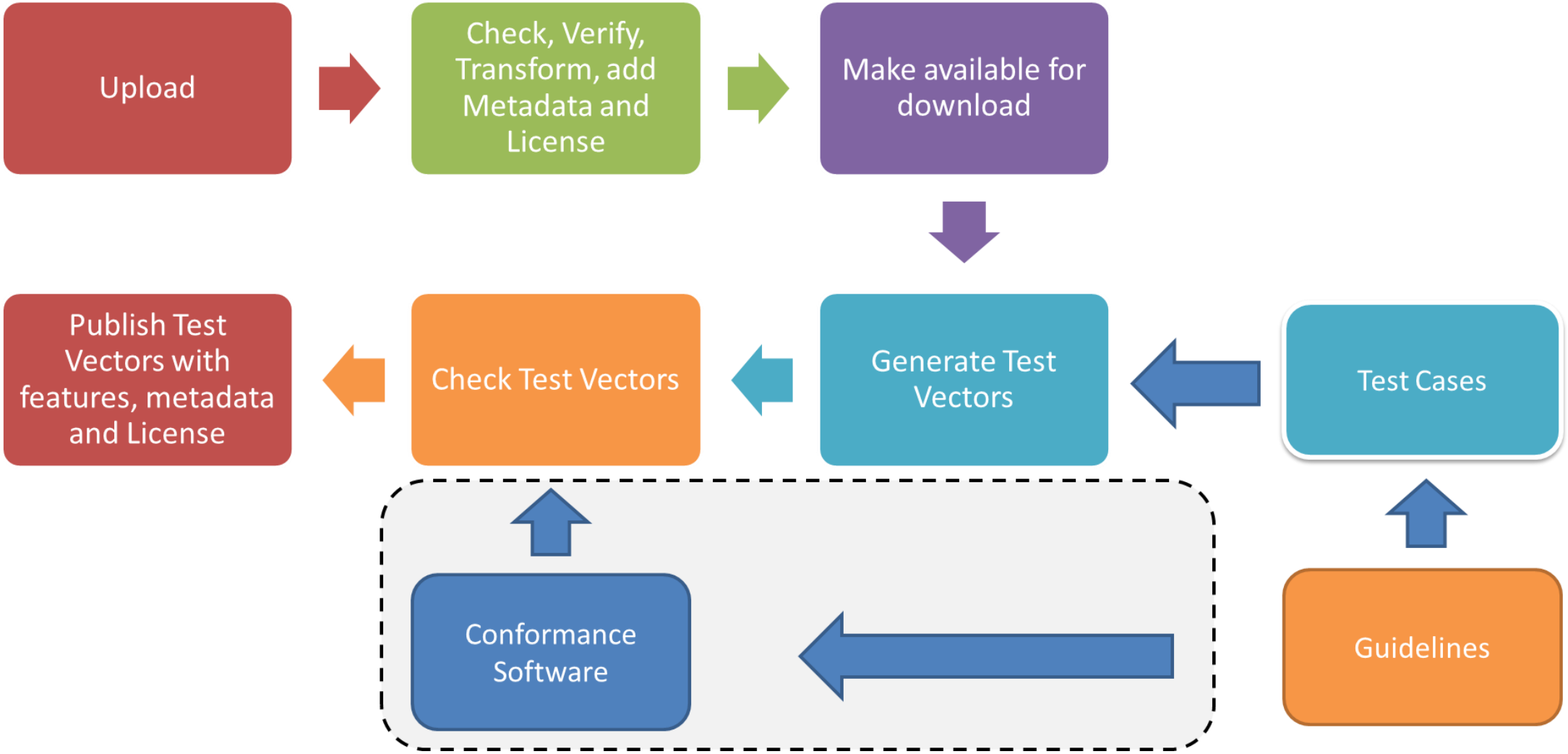
Test Vector Development Process



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Guidelines, beyond Version 1 …

- Near term: additional Use Cases, with a close relationship to OTT Streaming and Download
  - including some Live distribution aspects
  - Considerations for broadcast or 5G networks
  - Consideration of UHD use in VR
- Mid-term: beyond 3 DoF: “3DoF+”
- Ultimate goal: 6 degrees of freedom for the best user experience

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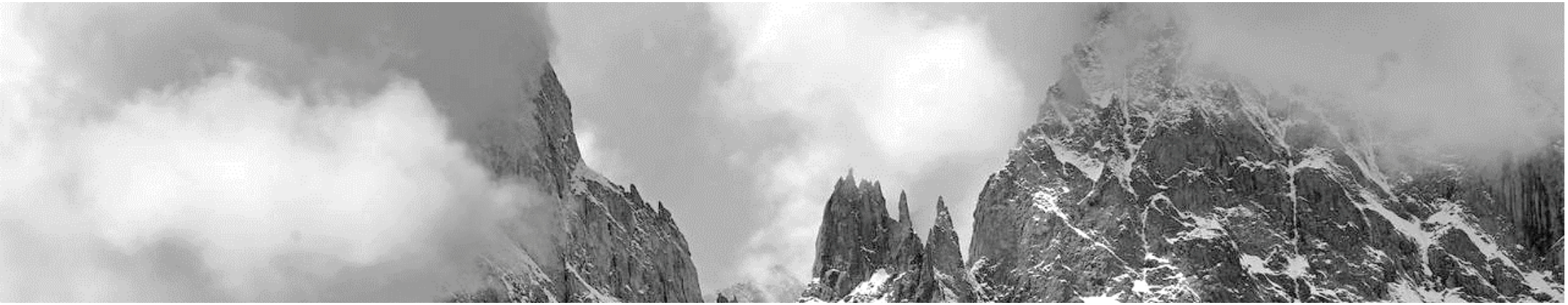

QUESTIONS?

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