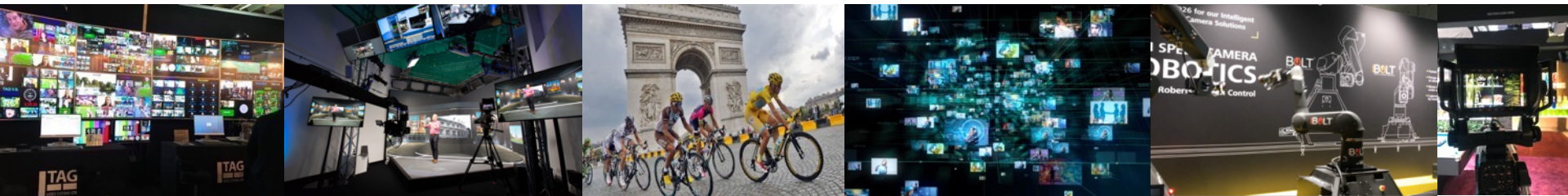


Media-Telecom Catalysts

Accelerating innovation across the media-entertainment value chain



Challenges at the Convergence of Media & Telecoms

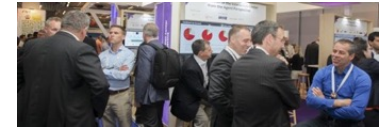
- The Telecoms, Media & Entertainment sectors are converging
- New technologies & online platforms are disrupting the entire media industry
- Large access providers and platform companies are integrating vertically
- Established giants are integrating horizontally
- Cross-sector evolution is complex, requiring new approaches to innovation at speed:
 - Audiences are fragmenting across many platforms, screens & devices
 - There is greater competition for viewer engagement than ever before
 - A fundamental shift from hardware to software/ IP for content creation & delivery
 - A race to deploy immersive technologies like 4K/UHD, HDR, VR & AR and AI
 - Regulatory disparity between telcos, broadcasters and online platforms & players
 - Escalating battles for sports rights and in original content
 - Delivery networks & distribution channels are evolving to 5G, fibre rollouts...

TM Forum & IBC are committed to working together to build a cross-sector platform to seed innovation over the next three years, including partnering on **Media-Telecom Catalysts**



What are Media-Telecom Catalyst Projects?

- Catalysts are rapid-fire proof-of-concept projects creating innovative solutions to telco-media industry business & technology challenges.
- They are designed to solve complex cross-sector and media specific challenges over an intensive 2-3 month project timeline.
- Catalysts demonstrate the business value that can be achieved from implementing standards-based solutions, to encourage implementation of standards and best practices in real products in the market.
- They are developed by ecosystem players large and small from media & entertainment companies, communications service providers, system integrators, vendors & enterprises.
- They will culminate in showcase demonstrations at IBC and TM Forum's Digital Transformation World (DTW) events in 2019.
- A Call for Catalysts challenges, Champions and Participants is open now until 15 December 2018.
- Catalyst Projects are managed by TM Forum in collaboration with IBC.



“With an R&D cycle, 5 times faster than in-house, the power of the Catalysts is undeniable”

Based on an Existing Successful TM Forum Programme

- TM Forum has been running telecoms-related Catalyst projects with its members for many years
- 25 Catalysts showcased at TM Forum's Digital Transformation World 2018
- Media-Telecom Catalysts are an extension of this existing successful program for 2019

Immersive Broadcasting Using 5G network Slicing & Drones: Tour de France Use-Case

This example Catalyst demonstrates how service providers can enable new revenue streams by managing and launching 5G slice-based services including 4K video streaming, drone-based broadcasting and IoT-provided statistics at events like the Tour de France. This project brought together AT&T, Orange, TIM, NTT & BT as Champions.

Live Sport Coverage Using Drones

Tour de France – the world's most famous cycle race

tmforum



- Providing connectivity and services is a unique challenge
- 21 stages, 3500km, 12m spectators, 190-country broadcasts
- Annually changing routes makes traditional techniques obsolete
- Live feeds, streaming, telemetry, drones and more
- **5G offers huge potential for supporting new services and revenue streams**

5G Intelligent Service Planning & Optimization

A moveable 5G network, creating an ever deeper, truly immersive experience for fan engagement.

Media-Telecom Catalysts: Terminology & Ground Rules

| | |
|------------------------|--|
| Media-Telecom Catalyst | A proof-of-concept project addressing a media ecosystem challenge (ie the prospective buyer of the solution developed by the Catalyst is a media company) |
| Catalyst Champions | <p>The prospective buyer of the solution developed by the Catalyst</p> <ul style="list-style-type: none">• Sets the business challenge and advocates the solution• Open to any company which is a provider of media & entertainment services, such as a broadcaster, an OTT, a content creator, production company, a rights owner or a provider of mobile or fixed telecoms services, for example. |
| Catalyst Participants | <p>Vendors, system integrators, consultancies and enterprises for example, who design, project manages and provides resources to build the solution:</p> <ul style="list-style-type: none">• Open to sponsors & exhibitors at IBC2018 &/or 2019• Open to TM Forum members |
| Qualifications | Catalyst team must have at least 1 Champion + 4 Participants* |
| Fees | <ul style="list-style-type: none">• Participants pay Catalyst Participation Fees• Champions do not pay |
| Showcases | <ul style="list-style-type: none">• TM Forum Digital Transformation World, Nice (May 2019)• IBC (September 2019)• Catalyst Participation Fee covers both events |

* Smaller teams with 3 Participants may be allowed by exception

Catalyst Team Member Commitment

Champion's Commitment

- Helping to define the business challenge and validating that the project addresses a significant industry problem
- Providing business requirements, clarifications and feedback for the use cases within the project
- Validating that the proposed project deliverables will provide value to the industry
- Giving feedback on solutions as they are developed
- Promoting the solutions within their organizations and to the wider industry
- Providing a 'sponsor' for the project, and a working level engagement contact (can be the same person)
- Attend at least 80% of meetings
- Attend showcase events and Action Week

Participant's Commitment

- Develop project plans and timelines
- Develop solution design and executable deliverables including the proof-of-concept demonstration
- Complete the necessary documents (charters, templates, etc.) as required by the Catalyst program
- Harvest the learning and assets from the Catalyst to create best practices guidance and standards for the industry (e.g. TM Forum Open APIs)
- Work collaboratively with other project team members
- Attend at least 80% of meetings
- Attend showcase events and Action Week

Value Propositions: I use Catalysts to...

"...prove new ideas (and new suppliers) quickly and cost-effectively"

Sam
CTIO

"...gain deep understanding of customer requirements and partner capabilities"

Amir
Chief Operating Officer

"...prove the value of co-creating solutions with telecom industry partners"

Jeffery
Enterprise Architect

"...demonstrate alignment between technical initiatives & business strategy"

Yon
Chief Marketing Officer

"...learn new tools, skills and techniques"

Mathys
Director of Strategy & Tech Innovation

Sandra
Chief Commercial Officer

Deming
Director Product Management

"...get recognition for my company's innovation and develop new client relationships"

Lin Zhu
Digital Ecosystem Innovator

Vanja
Senior Developer (CSP or Supplier)

"...show how my company's innovation helps the industry"



Benefits of joining a Catalyst Project

- 01 Multiplication of resources (x5)**
 Catalysts serve as extensions to your R&D departments where resources are pooled by participating organisations
- 02 Acceleration of R&D**
 With an R&D cycle considerably faster than most in-house cycles, the power of the Catalysts is undeniable. TM Forum manages each of these projects ensuring structured programmes are in place. All this comes at a fraction of the cost that you would have incurred internally
- 03 Creativity from a multi-company team**
 Working with some of the brightest minds from outside your company helps get fresh perspectives into the project
- 04 Testing Platform**
 Learn how your solution works with others from the industry in a hands on environment. Receive real requirements and sincere feedback from the 05 Champions and industry colleagues
- 05 'Trust' – A safe place to innovate**
 Explore new concepts: without needing to expend time and energy to form commercial relationships – TM Forum takes care of the contracts.



Marketing Value Proposition

01

Catalyst Showcases

- Dedicated Catalyst exhibition booths at DTW Nice and IBC
- Branding & promotion at the Showcase events
- Theatre presentations (25 mins) at each event
- Help creating the marketing pitch, presentations & collateral
- Help reaching the right audience at the Showcase events

02

Project featured on TM Forum & IBC websites, including...

- Video (at Action Week) presenting the Catalyst submission
- Video (at the Showcase events) presenting the results
- Blog posts (eg on TM Forum Inform and IBC365)
- Promotion in newsletters, event marketing, social media

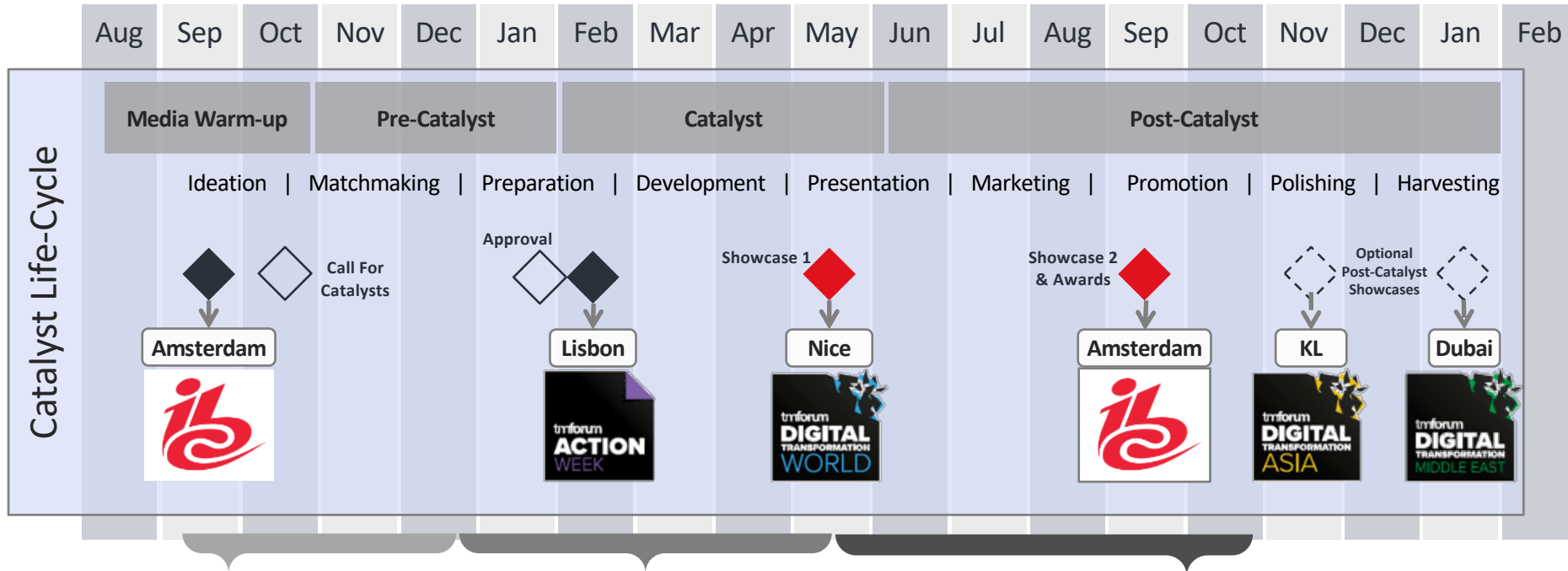
03

Additional opportunities

- Catalyst Awards at IBC2019
- Publish further blogs, written interviews and articles
- Further post-event digital marketing (e.g. virtual Catalyst showcases, webinars...)



Media-Telecom Catalyst Cycle



- TM Forum / IBC help with the idea generation process
- We also help find champions and participants to fill the team

- Catalyst teams work to a project plan template provided by TM Forum
- A TM Forum / IBC domain expert supports the team
- Work takes place via regular calls and use of a project workspace hosted by TM Forum
- The teams meet face to face at TM Forum's Action Week event in Lisbon

- TM Forum and IBC provide Catalyst pavilions to showcase the projects in Nice and Amsterdam, as well as other marketing activities to promote the projects
- Learnings and assets from the Catalysts are harvested into TM Forum best practice and standards

Six Concepts to Seed the Catalysts

Ideas to illustrate topical, broad areas which Catalysts projects could potentially address.

We welcome specific ideas within these and other areas, from either champions or participants:

Live Sport Coverage Using 5G Drones:

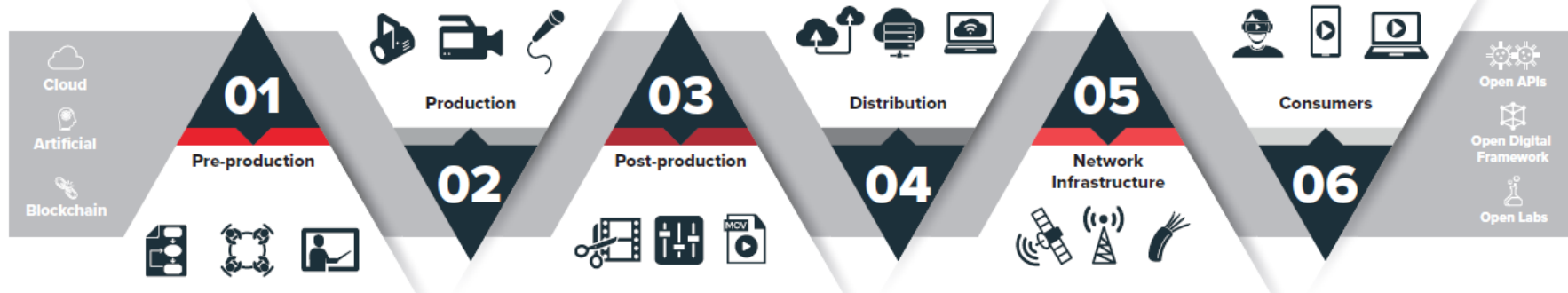
This existing Catalyst used Tour de France as its use case to show how communications service providers and broadcasters can enable new revenue streams by managing fan engagement and immersive experience. It demos 5G slice-based services including 4K video streaming, drone-based broadcasting, real time 360 VR/AR and IoT-driven statistics.

Anonymous Data API for Mobile Media Metrics:

Monitoring advertising performance on traditional TV is commonplace, less so on mobile media - the fastest growing digital media segment. This challenge has held broadcasters back from monetising the medium. This Media Catalyst proposes developing an Open API that enables mobile network operators to anonymize sensitive audience data and share it with third parties, without compromising GDPR.

VR, AR & Mixed Reality:

The possibilities of VR, AR and mixed reality for the entertainment and gaming sector are set to grow with 5G. Early offerings tend heavily to sport, but broadcasters around the world are still exploring how to best use these new, immersive technologies to reach their audiences. This Media Catalyst could explore use cases from live, and immersive broadcasts, to behind the scenes tours, and stand-alone storytelling experiences.



AI in Video Content Production & Distribution:

AI creates many potential applications and new opportunities for the media, broadcast, and entertainment industry, aside from its early deployment in personalisation of content for marketing, discovery, advertising and experiential innovation. A Media catalyst in this space could explore the specific challenges of handling, transporting, exploiting or distributing such large volumes of data, and the workflows required to achieve major AI projects.

Using Blockchain To Support The Media Supply Chain:

Blockchain can be used to help companies keep track of creative content assets, avoid contractual disputes and establish the certainty and accountability that will foster trust with business partners and customers. This Media Catalyst examines areas as diverse as royalty tracking and collection, crowdfunding of creative productions, digital advertising measurement or insourcing distributing and tracking trustworthy news.

Tackling Piracy, Proxies & Unblockers:

VPNs, proxies and un-blockers can be used to unlock geo-locked shows that are not licenced for a particular region. This kind of piracy has morphed from torrents into "fully loaded" streaming boxes that make accessing unlicensed content push-button-easy. This Media Catalyst could examine potential tech-led solutions to combat or block illicit access to content via such services, sites and devices.

Media-Telecom Catalyst Pricing 2019

- **Catalyst Participation Fees (Champions do not pay fees)**
 - Based on categories, below defined by annual revenues
 - Full Catalyst Showcases at DTW Nice (May-19) and IBC (Sep-19) are included with the Catalyst Participation Fee*
 - Champions do not pay Catalyst Participation Fees
 - Each Catalyst must have at least one Participant at Category A/B, or two Participants at Category C
 - Prices may be revised after Year 1
- **Optional Post-Catalyst Showcase Fees**
 - May be purchased separately at any time during the relevant Catalyst Cycle

| Annual Revenues (USD) | Category | Equivalent TM Forum Membership Category | Media-Telecom Catalyst 2019 Participation Fee | Post-Catalyst Showcases | |
|-------------------------------|----------|---|---|-------------------------|----------|
| | | | | Asia-19 | Dubai-20 |
| > \$25 billion | A | Corporate A1, A2 | \$28,700 | \$7,850 | \$5,800 |
| \$100 million to \$25 billion | B | Corporate A3, B1, B2 | \$18,800 | \$5,200 | \$3,800 |
| \$25 million to \$100 million | C | Corporate C | \$14,600 | \$4,000 | \$2,950 |
| \$1 million to \$25 million | D | Corporate D | \$8,500 | \$2,300 | \$1,700 |
| < \$1 million | E | Corporate E | \$2,300 | \$1,000 | \$800 |

* No unbundling of the events is permitted

Background & Links

“The digital age is changing the landscape for creation, distribution and consumption of media, and we believe that through industry collaboration we can drive a new wave of innovation and growth.” **Nik Willets, CEO, TM Forum.**

“With the media and telecoms sectors more closely intertwined than ever before, it makes perfect sense for IBC and TM Forum to collaborate and in doing so, we will ensure that both of our communities continue to advance together..”

Michael Crimp, CEO, IBC

“We are always on the look-out for innovative ways to improve our customers’ experience as the telecoms and media industries increasingly converge. Therefore, I warmly welcome the new collaboration between IBC and TM Forum and look forward to the fruits of the new Catalyst programme as it promises to address some of the most pressing industry issues we face today.”. **Veenod Kurup, Group CIO at Liberty Global.**

What Participants are Saying...

“The Catalyst program is a very effective platform to encourage innovation to solve problems faced by the community. The collaborative model is something that service providers would not be able to replicate on their own without commercial obligations. TM Forum has taken care of the contractual aspects in the collaboration allowing the Champions and Participants to truly focus on solving the problem at hand. We encourage others to really leverage this platform to its fullest potential.” **Globe Telecom, Philippines – Winners of Best in Show, TMF Live! Asia 2016**



“Catalysts are great for innovative conceptual trials; when you reuse results from one Catalyst to another Catalyst then you are really busy with moving forward the industry best practice assets.”, **Arnold Buddenberg, Enterprise Digital Business & IT Transformation Architect, Orange Group**



“Catalysts projects are open-innovation rapid fire proof of concept projects which offer unique collaboration opportunities. An essential experience for executives shaping the future in a 5G/ Platform economy driven world,” **Erik Meijer, Group Innovation, Deutsche Telekom**”

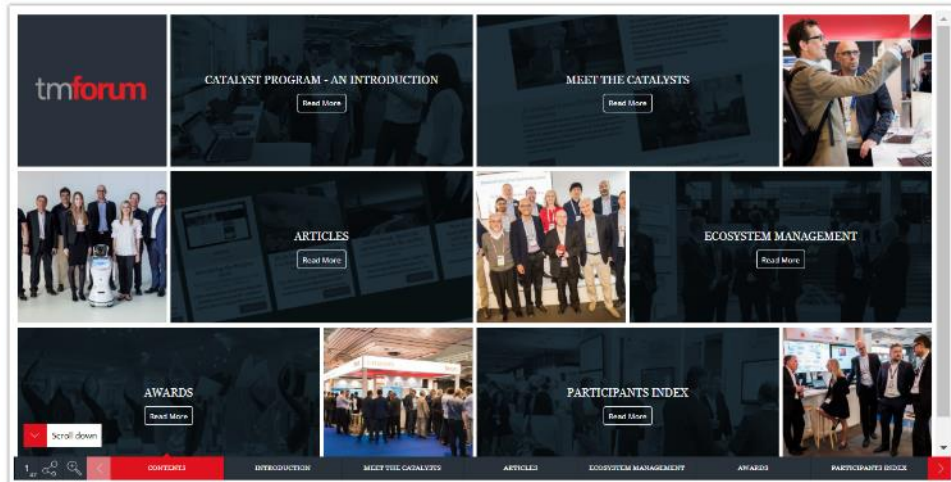


“Working with TM Forum members we proposed a standard for the IoT Ecosystem, we learnt a lot and demonstrated the value that our innovative Optimus Platform can bring to the digital transformation ecosystem. From my perspective, TM Forum is the best marketing platform that exists.” **Claus R. Nielsen, Vice President of Marketing, Neural Technologies**



TM Forum Catalyst Resources

Catalyst Interactive Brochure



Catalyst Video



About IBC & TM Forum

IBC, with a vast community of international broadcast, media & entertainment organisations is collaborating with the TM Forum which represents more than 850 global communications service providers and their suppliers.

Together we are bringing the TM Forum's highly successful collaborative Catalyst Innovation programme to the converging media-telecoms value chain. The aim is to create cross sector ecosystems – through a fast track innovation cycle, that helps organisations to capitalise on the opportunities presented in a rapidly evolving digital world.

About IBC



- IBC is the world's most influential media, entertainment and technology show
- It convenes more than 57,000 attendees from over 170 countries to its annual event
- IBC's Board includes IABM, IET, IEEE Broadcast Technology Society, The Royal Television Society, The Society of Cable Telecommunications Engineers (SCTE) and the Society of Motion Picture & Television Engineers (SMPTE)

About TM Forum



- TM Forum is the global communications industry association driving digital business transformation through collaboration & innovation
- It is a neutral, non-profit, led by the world's leading service providers
- With 90k professional members, it serves 850+ global companies
- TMF's board is representative of the global communications industry
- Members generate US \$2 trillion in revenue, and serve 5 billion customers across 180 countries
- It convenes TMF membership at events throughout the year, in Nice, Lisbon, Dubai, Kuala Lumpur and Dallas