EBU

OPERATING EUROVISION AND EURORADIO

# AUTOMATION: APPLICATIONS, TECHNIQUES AND TECHNOLOGIES

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EBU Webinar 2020-07-30

BBC CBC Radio-Canada

# TECHNICAL REPORT TR 055

https://tech.ebu.ch/publications/tr055

BBC CBC Radio-Canada EBU IRT rtbf SWR vrt

# AUTOMATION

- Essential to realise benefits of an all-IT approach
- Free staff from tedious and error-prone manual activity to concentrate on creative aspects
- Move away from fixed functions to reconfigurable facilities
- Techniques, technologies and terminology may be unfamiliar for traditional broadcast
- Learn from wider IT industry
- EBU Automation & Provisioning project

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# CONTENTS

- Introduction, scenarios and terminology
- Case study: automated provisioning for IP facilities
- Case study: business process automation
- Managing constraints and priorities
- Logging and monitoring
- Automation for business transformation
- Challenges
- Q&A

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# What is “Automation”?

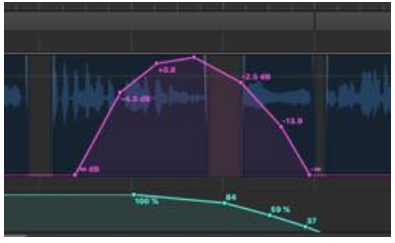
Wikipedia

- …the technology by which a process or procedure is performed with minimal human assistance

```
while on_air
  programme = next_scheduled(now)
  playout(programme)
end while
```

Has long been used to refer to specific broadcast technologies e.g.

- Scheduled playout
- Automatic changing audio parameters



More wider use in IT e.g.

- Software development
- Managing data centres

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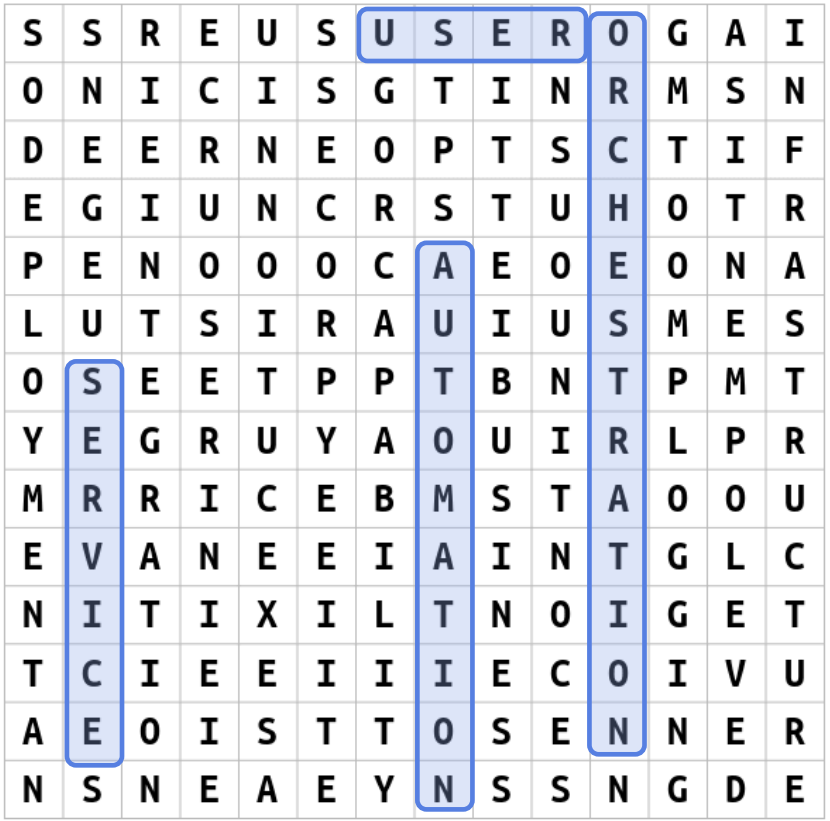
# Examples of where broadcasters could benefit from automation

- Resource allocation (studios, cameras, operators, graphics rendering…)
- Automatic logging through speech and video analysis
- Trigger technical tests when content is delivered
- Music reporting and compliance through audio analysis
- Creating multiple versions of a programme
- Updating and testing equipment and software
- Reduce overhead in populating schedules, risk assessments, rights payments…

# Terminology

- Can be confusing
- Terms used inconsistency
- Check what is meant!



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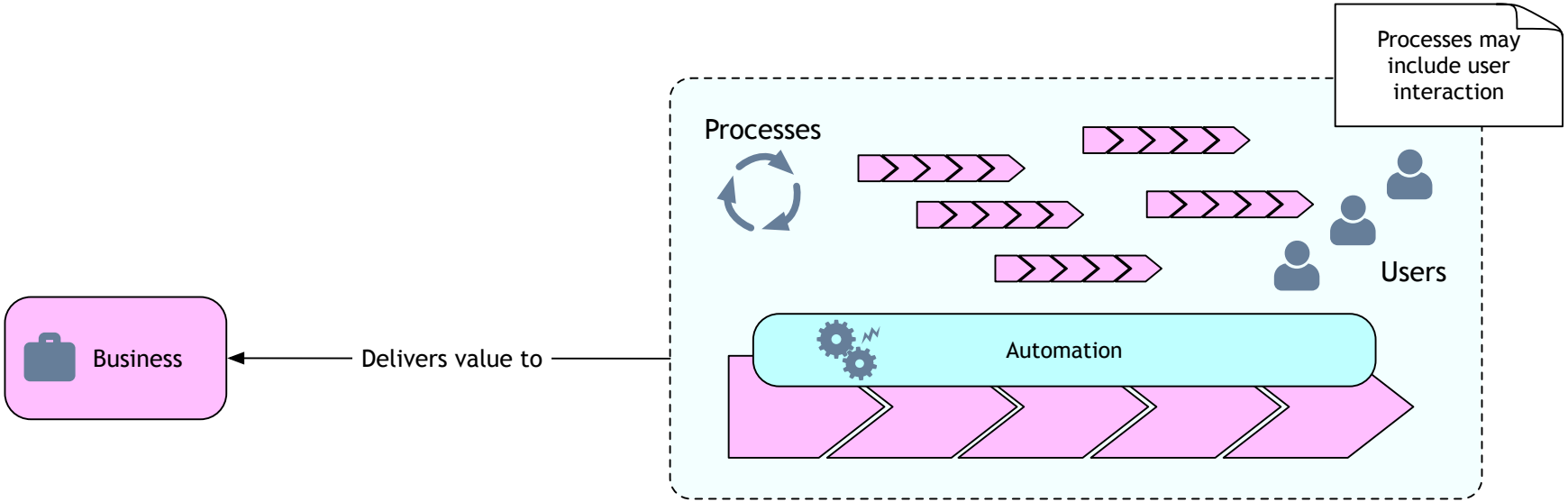
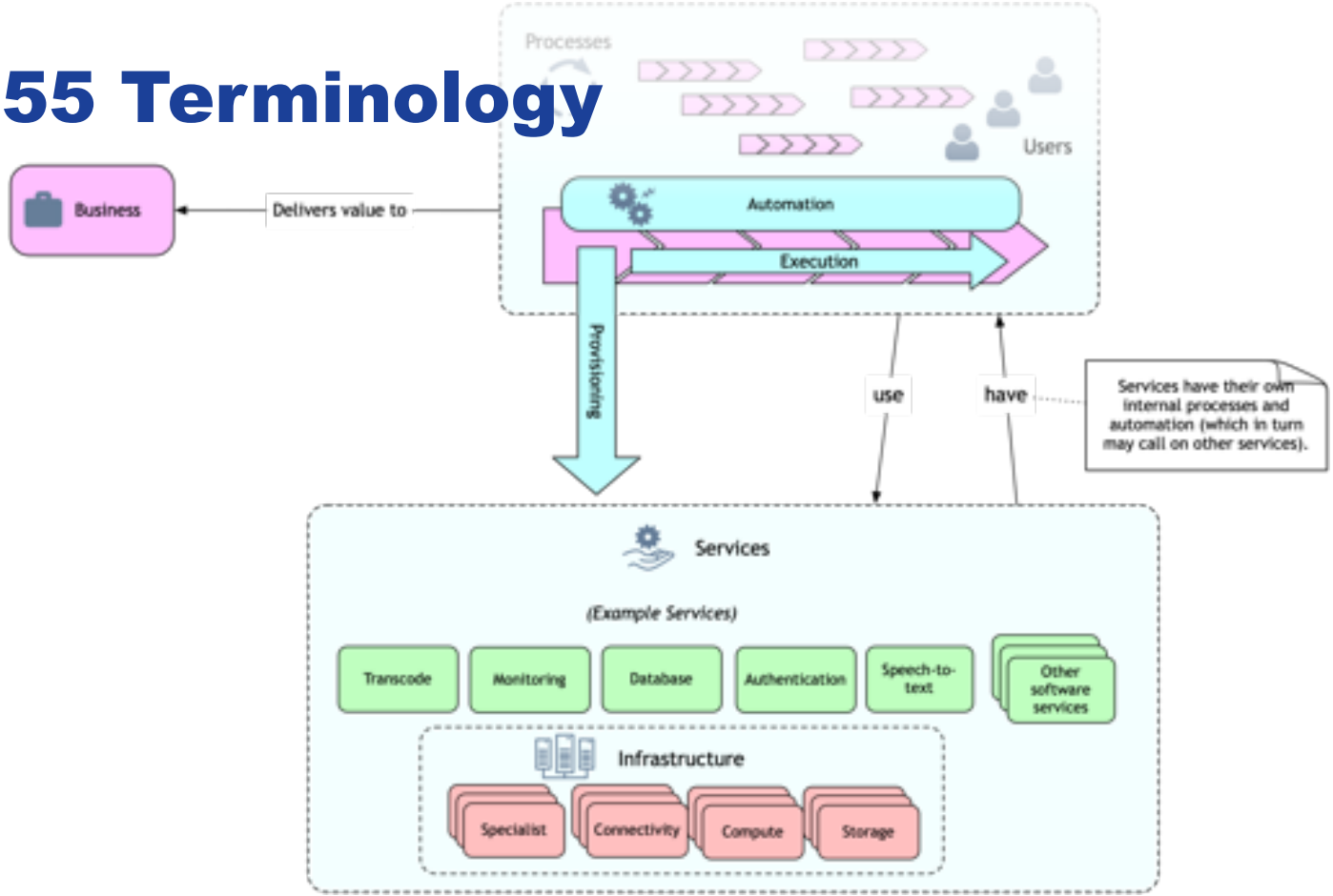
thewordsearch.com/puzzle/1328350

# TR 055 Terminology



# TR 055 Terminology



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- Q&A

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# New all-IP facility in Montréal to air in 2021

- News and general radio, TV, online production studios, national MCR
- 5,000+ endpoints from small appliances to massive servers
- 330+ media network switches, 1000+ layer3 uplinks
- 20,000+ media and control ports
- 50,000+ fibre interconnects

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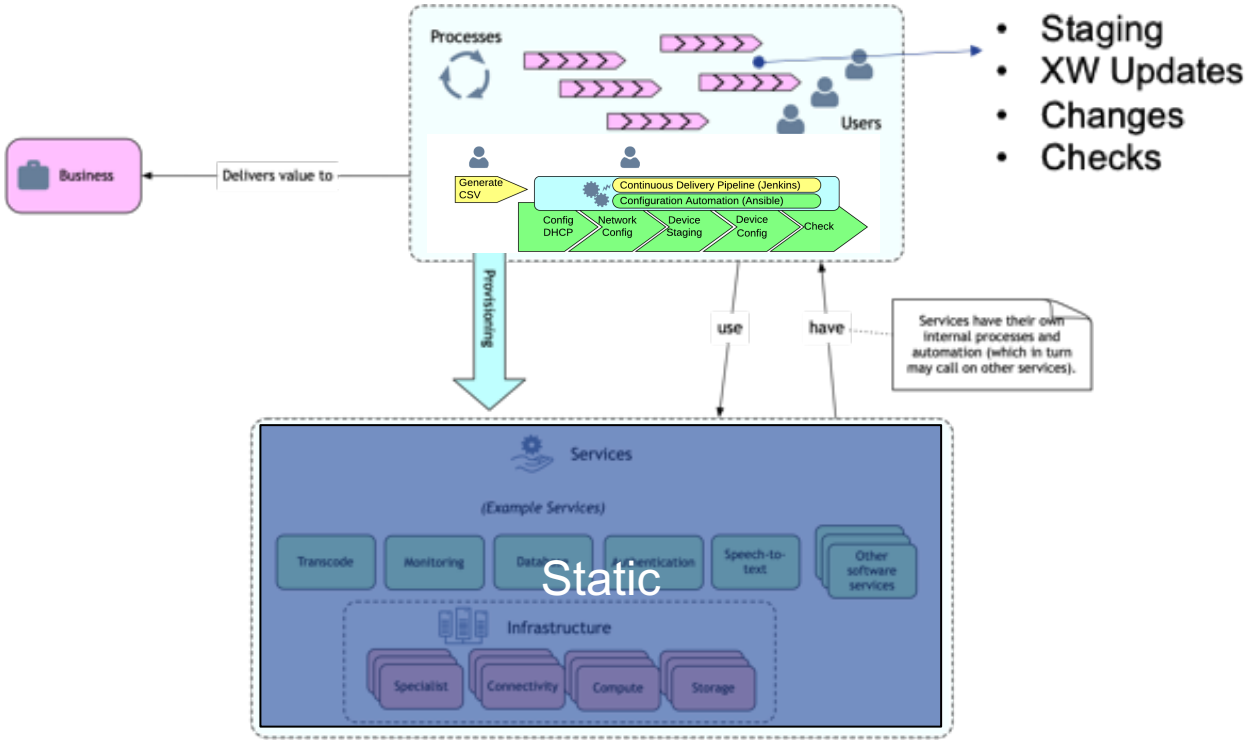
# Encountered challenges

- 100s++ parameters per device
- More Software and Firmware updates
- Prevent conflicts of IP and Multicast addresses
- Operating safe changes
- Ensure documentation is accurate
- Ensure health of complex system

# Automatic deployment of IP facilities




- Staging
- XW Updates
- Changes
- Checks

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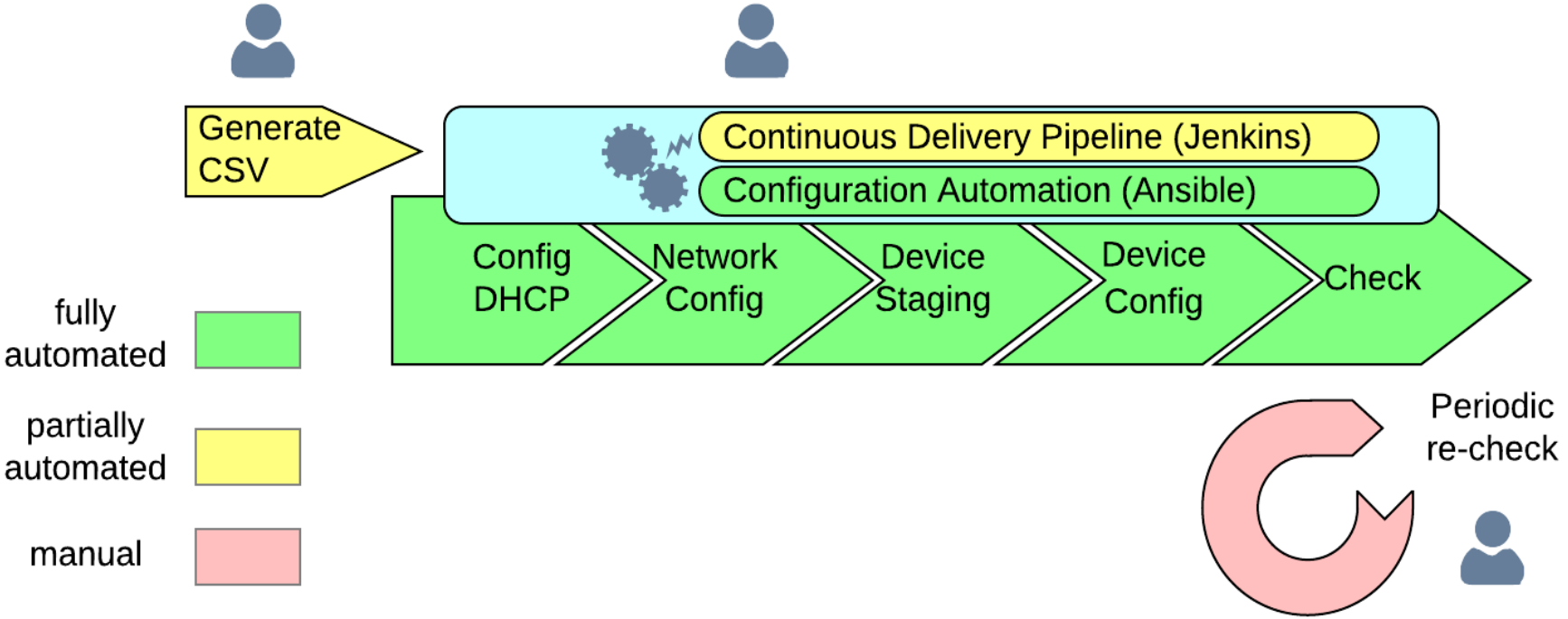
# Automated configuration of IP devices

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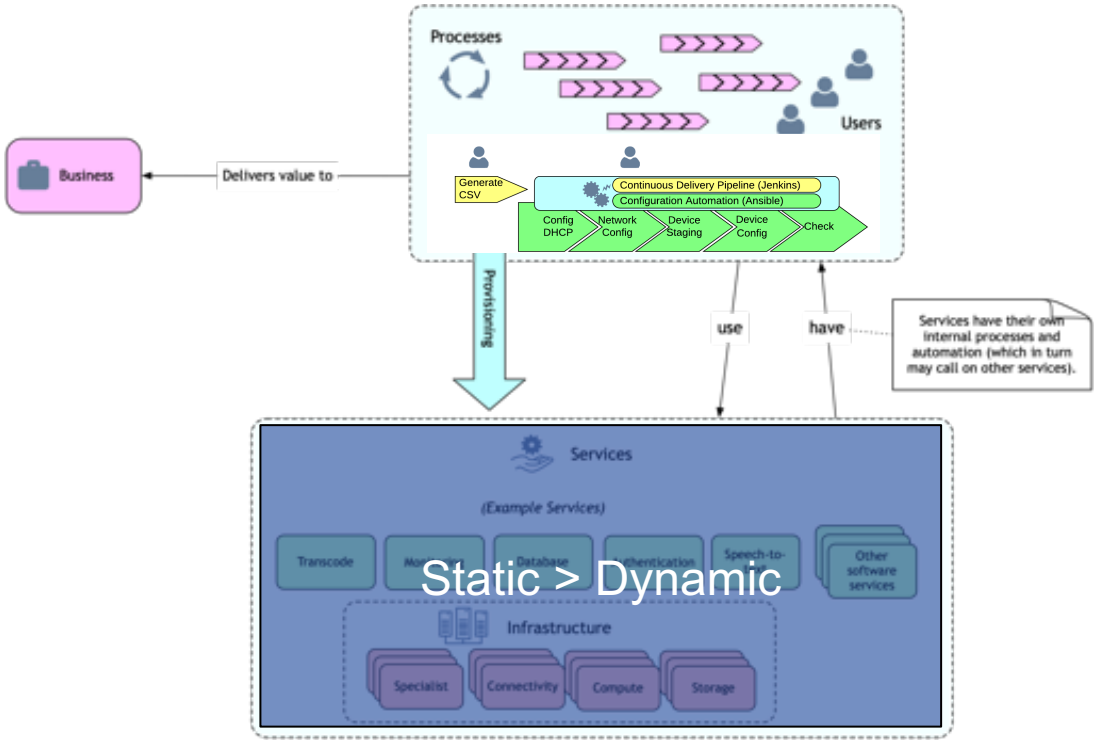
For more on this use case – presentation at last EBU NTS:
https://tech.ebu.ch/contents/publications/events/presentations/networks20/towards-continuous-deployment-of-media-over-ip-infrastructure.html

# Enabler of agile facilities

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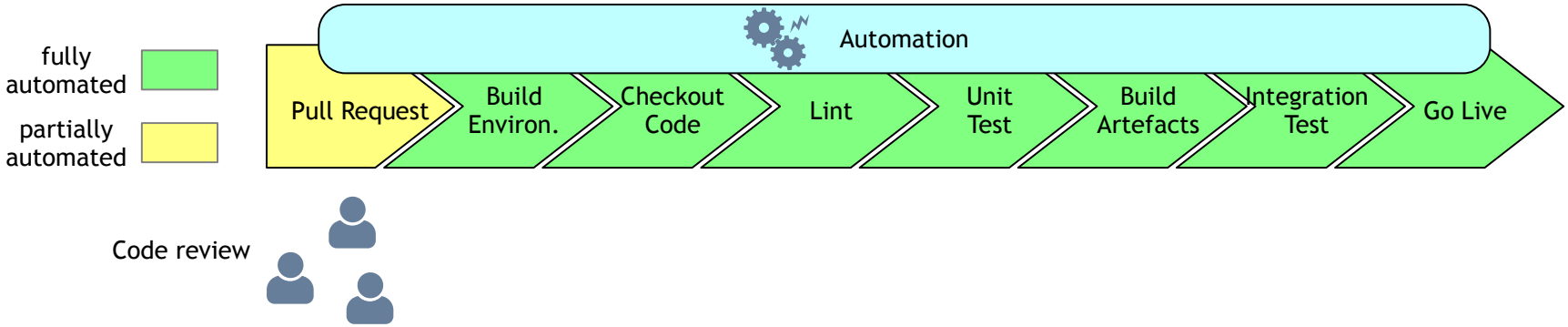
# Continuous integration and deployment (CI/CD) of services




- E.g. development of cloud-based media services
- Commonly used for “Agile” and “DevOps” approaches
- See TR 055 for a case study

# Tools for CI/CD

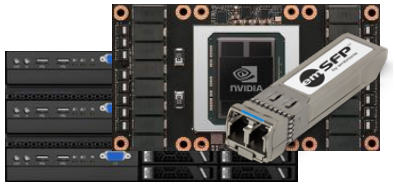
- Software development automation: Jenkins, CircleCI, TravisCI…
- Provisioning and configuration management: Vagrant, Terraform, Ansible…
- Containerisation: Docker…
- Container automation: Kubernetes…

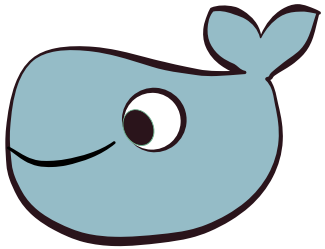
*These are all open source… other products are available!*

# Provisioning services

*specialised*
*long term*

*lightweight*
*short term*





Physical

Virtualised

Containerised

Serverless

*Other products are available!*

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# Business Process Automation

Operational Challenges:

- Manually intensive processes
- Use of spreadsheets
- Errors in data re-keying
- Availability of work activity status and metrics
- Support for continuous improvement
- Support for on demand operating models

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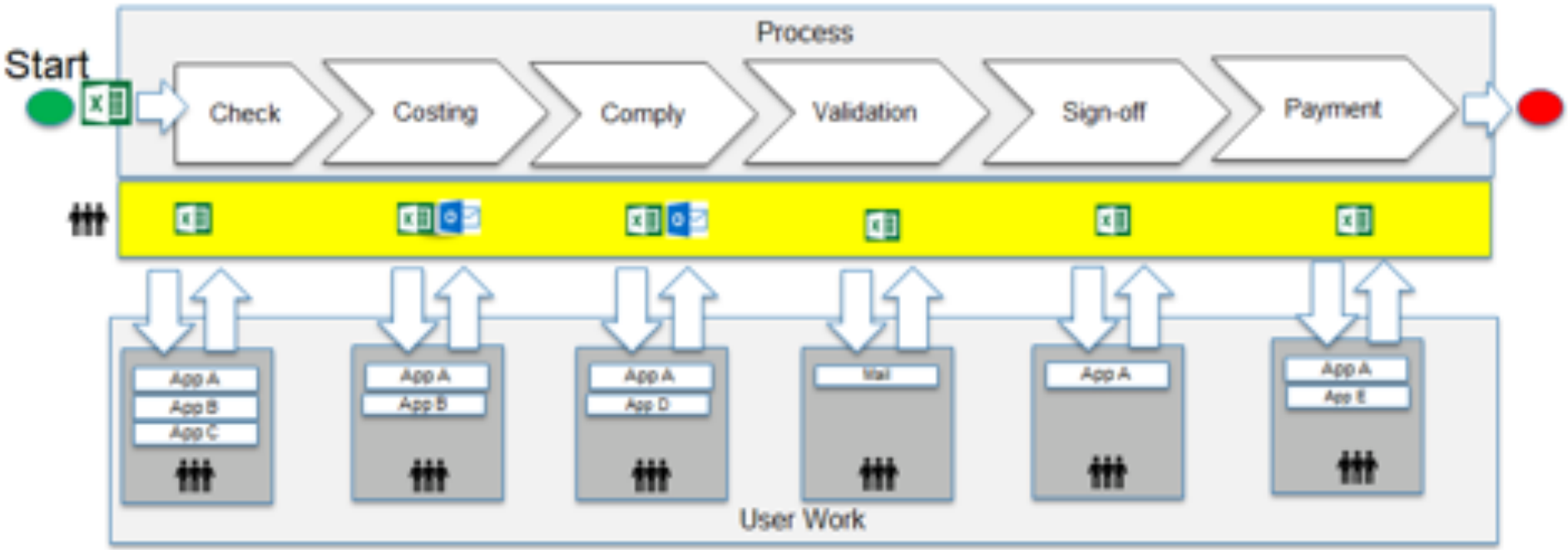
# Existing process example

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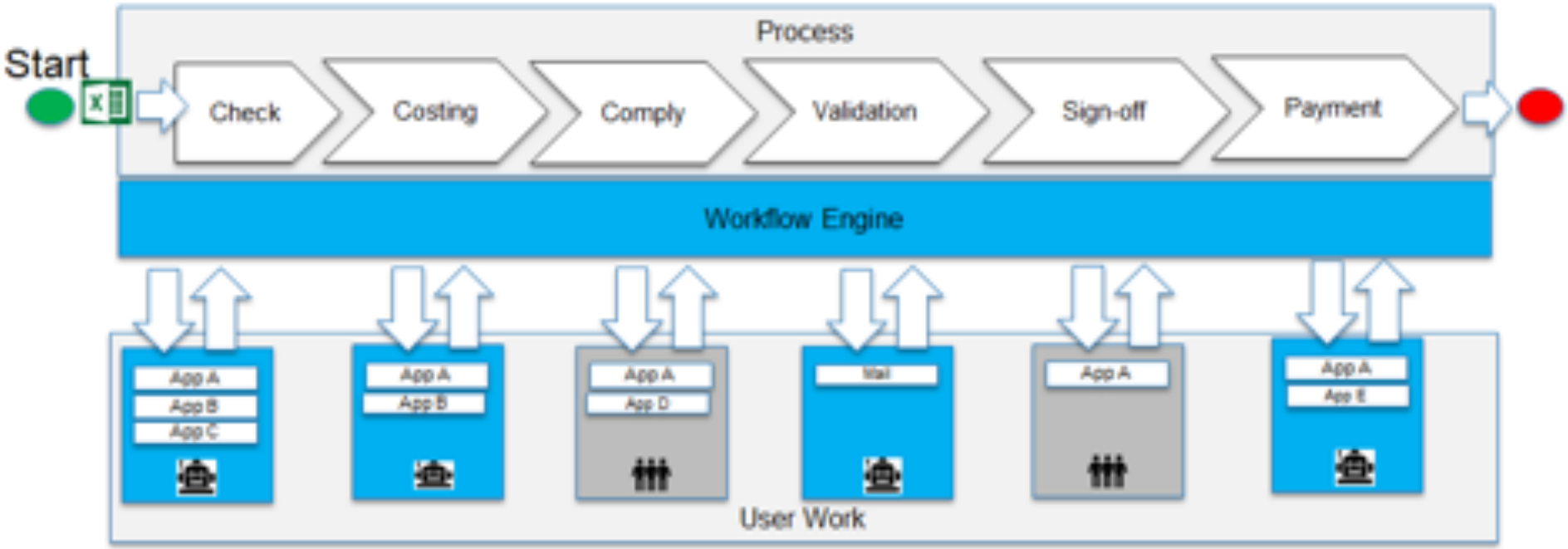
# Future state – straight through processing

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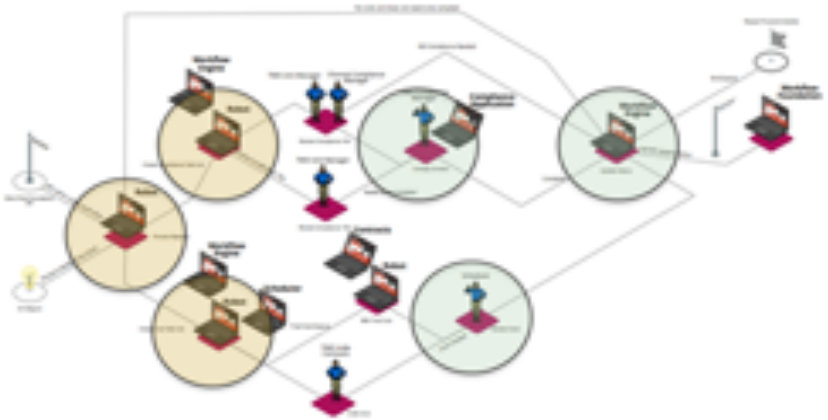
"Smart or intelligent business processes are among the most important modern technology areas that executives plan to invest in over the next five years" - Gartner

# Proof of value scope

To provide evidence of the potential value of intelligent process automation tools we built a demonstrator using a workflow engine and robotic process automation (RPA) based on an existing process.



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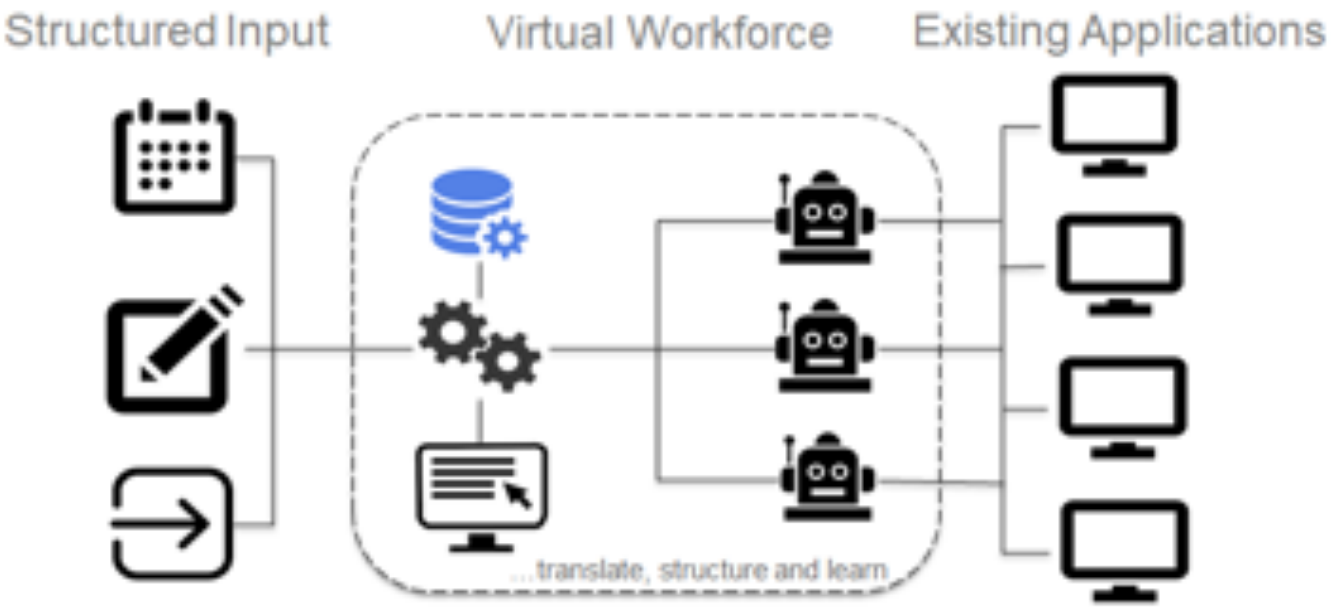
# Robotic process automation



# The Proofs of Value

We were able to demonstrate:

- **Process Optimisation and Digitisation**
- **Creation of Intelligent Processes**
- **Provide on Demand Elastic Work Queues**

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# The Proofs of Value

But there are potential barriers:

- **Data Quality**
- **Business rule complexity**
- **Process Management Maturity**

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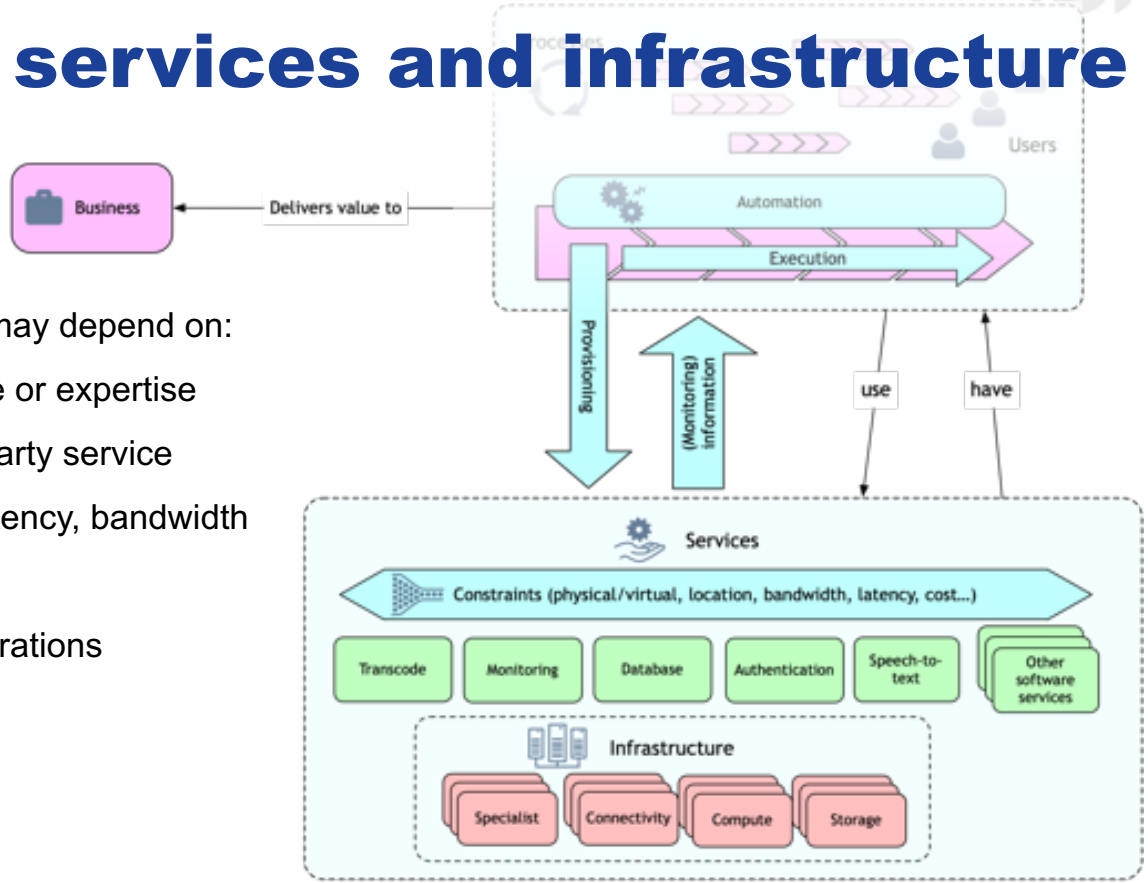
# Constraints on services and infrastructure

Where, when and how a process runs may depend on:

- Availability of specialist infrastructure or expertise
- Cost of local infrastructure vs third-party service
- Connectivity considerations: cost, latency, bandwidth
- Environmental considerations
- Data sensitivity and security considerations

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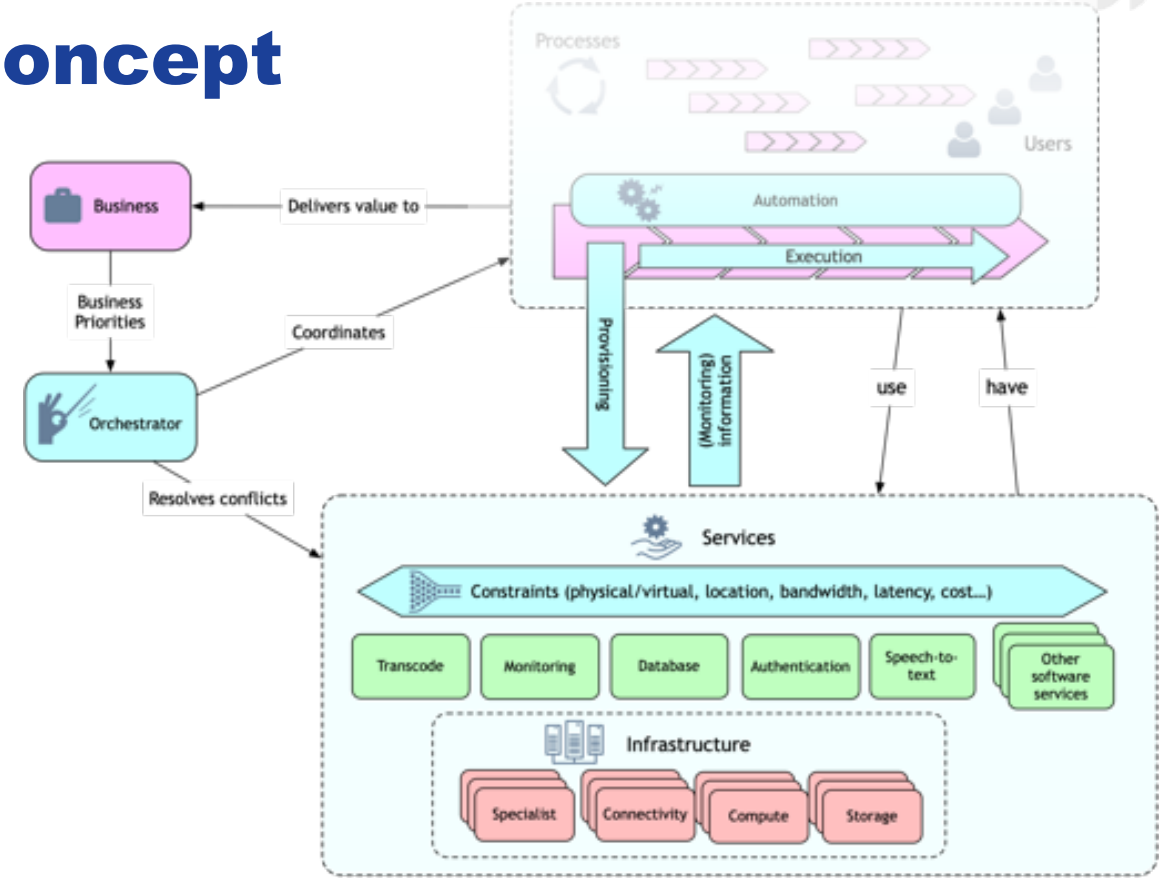
# Orchestrator concept

- Resolve resource conflicts across multiple processes according to business priorities.and constraints
- For example prioritise render service access to a production with urgent deadlines
- Might be implemented through building on technologies discussed in this webinar?
- See NTS presentation by Ivan Hassan and Jemma Phillips

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# Monitoring and Logging

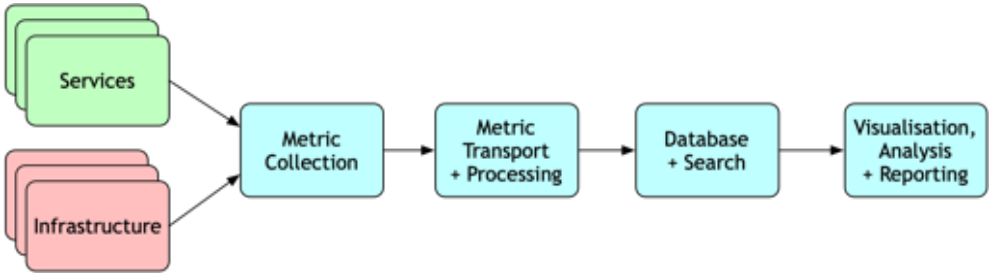
**Metrics** about processes, services and infrastructure

**Alerts** on unusual situations

**Logging** to help track down problems

**Dashboard** of current and historic metrics.

Processing for **operational and trend analysis**

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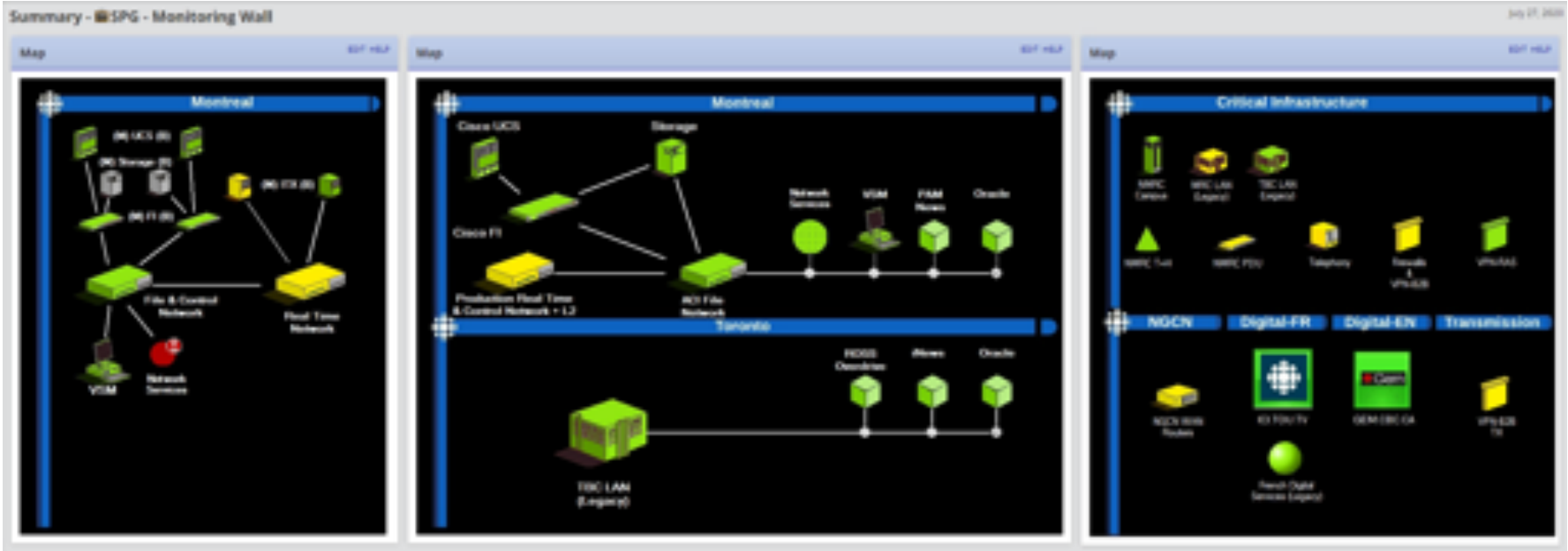
# "Single Pane of Glass" Dashboard

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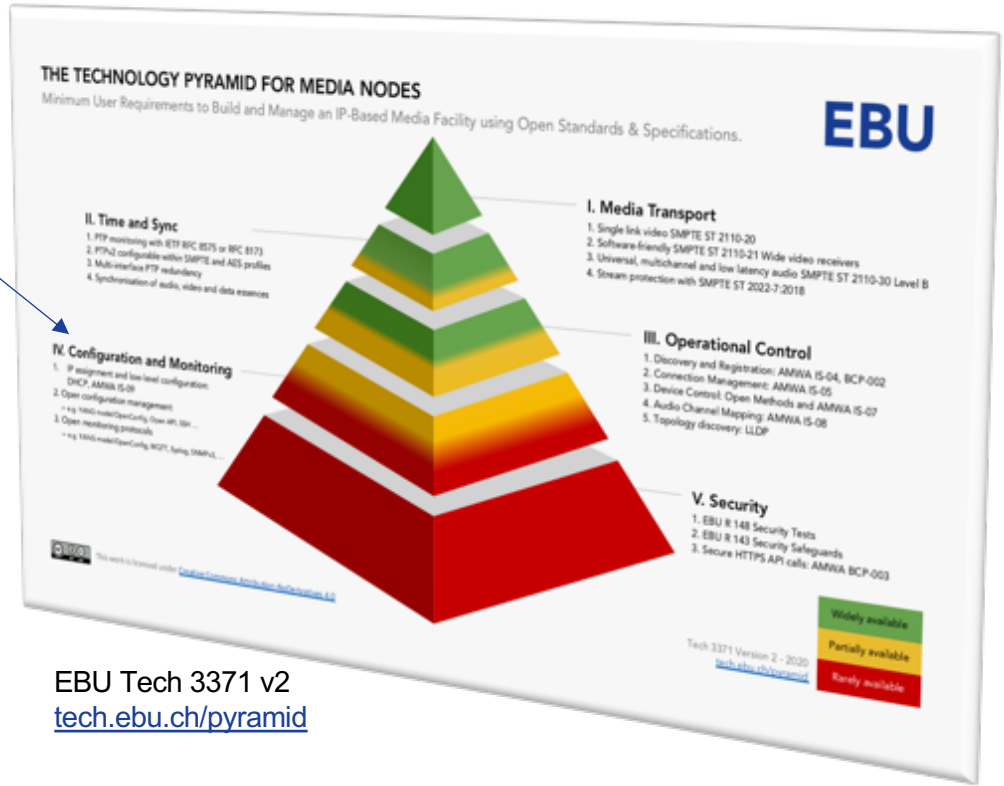
# Requirements on Media Nodes

- **DHCP**
- **Open Configuration Management**
  YANG/OpenConfig, Open API, SSH, ...
- **Open Monitoring Protocols**
  YANG/OpenConfig, WebSocket, MQTT, Syslog, SNMPv3, ...




EBU Tech 3371 v2
tech.ebu.ch/pyramid

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# The future of operations: Industry 4.0

Key Characteristics

- Digitisation of manual process
- Design thinking to unify outcomes
- Predictive & operational analytics
- Cognitive & Intelligent

Gartner: By 2024, organisation will lower operational costs by 30% by combining hyper-automation technologies with redesigned operational processes

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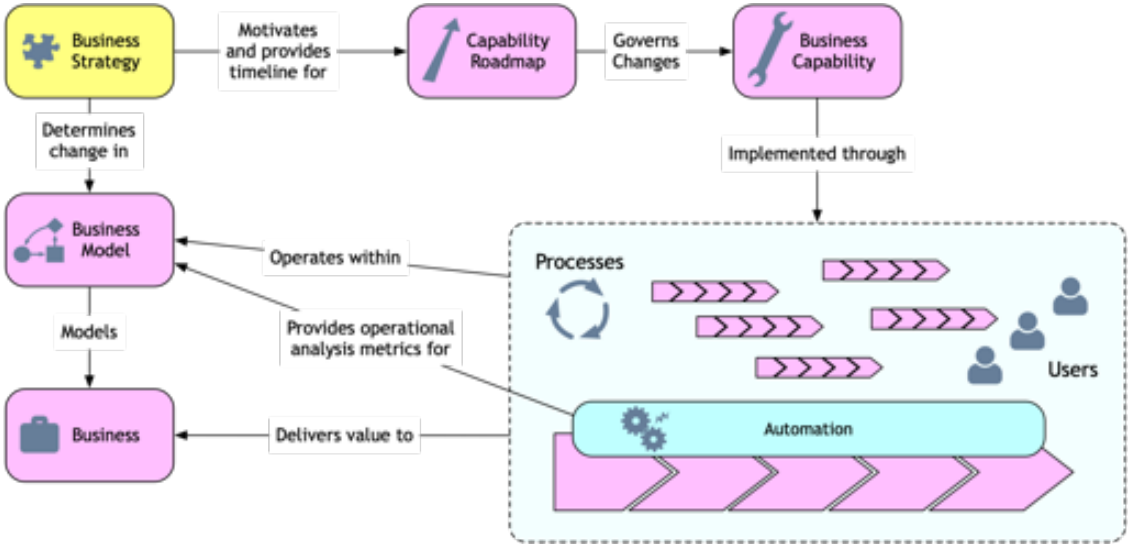
# The motivation for change

Data from automation combined with advanced analytics are increasingly being used to support:

- new business strategies
- changes to existing strategies
- creation of entirely new business model



# Automation is a global phenomenon

- Process automation is driving efficiency and reducing costs
- Enables measurement and continual improvement
- Operational excellence is becoming a core capability for digital organisations
- Advanced analytics and intelligence are used in leading organisations processes

"Across regions and industries, survey results suggest that automating businesses is a global phenomenon" - McKinsey

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# Challenges

- Need to support specialist infrastructure (hardware, devices, appliances…)
  - Interoperability for configuration and control
- Security: automation helps, but also brings new threats
- Training: operation, effect of latency, troubleshooting
  - Importance of feedback from monitoring and logging
- Change management: processes and jobs
- Balance between CapEx and OpEx; between on-premises and remote cloud
  - Don’t forget the hidden costs!
- Planning for the future

https://tech.ebu.ch/publications/tr055

Gordana Macher, Nadege Nzoyem (IRT), Daniel Freytag, Markus Ostertag (SWR), Hugo Ortiz (RTBF), Karel De Bondt, Kristof Demulder, Joris Grauwels, Dries Tastenhoye, Willem Vermost (VRT), Nestor A. Amaya, Alexandre Dugas, Louis Lamarre, Sunday Nyamweno, Felix Poulin, Loc Tran, Anthony Kuzub (CBC/Radio Canada), Peter Brightwell, Tim Cowin, Mike Ellis, Tom Dawes, James Gibson, Stuart Grace, Ivan Hassan, Nick Hopewell, Luke Hudson, Sam Mesterton-Gibbons, Jemma Phillips, Roland Rodgers, Ruth Sloan, Duncan Walker (BBC), Hans Hoffmann, Ievgen, Paola Sunna (EBU).

# What's next?

- Further investigation of CI/CD, DevOps and Infrastructure-as-Code
- Surveying models and technologies for different functions (e.g. monitoring)
- Contribution to training to address knowledge / skills gaps
- Contribution to wider EBU activity on cloud

# Call for action

- https://tech.ebu.ch/groups/automation

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