

20-APR-22

Continuous Deployment & Continuous Validation

Applying DevOps Methodologies to Data Infrastructure in
Regulated Industries

Damien O'Connor

AVEVA

About Cognizant – TQS Integration

TQS Integration

- Systems Integration and Consultancy Group for Manufacturing Industries
- Global Data driven solutions company
- Premier Global Partner for AVEVA PI
- Global EA Partner with AVEVA
- Acquired by Cognizant in July 2021

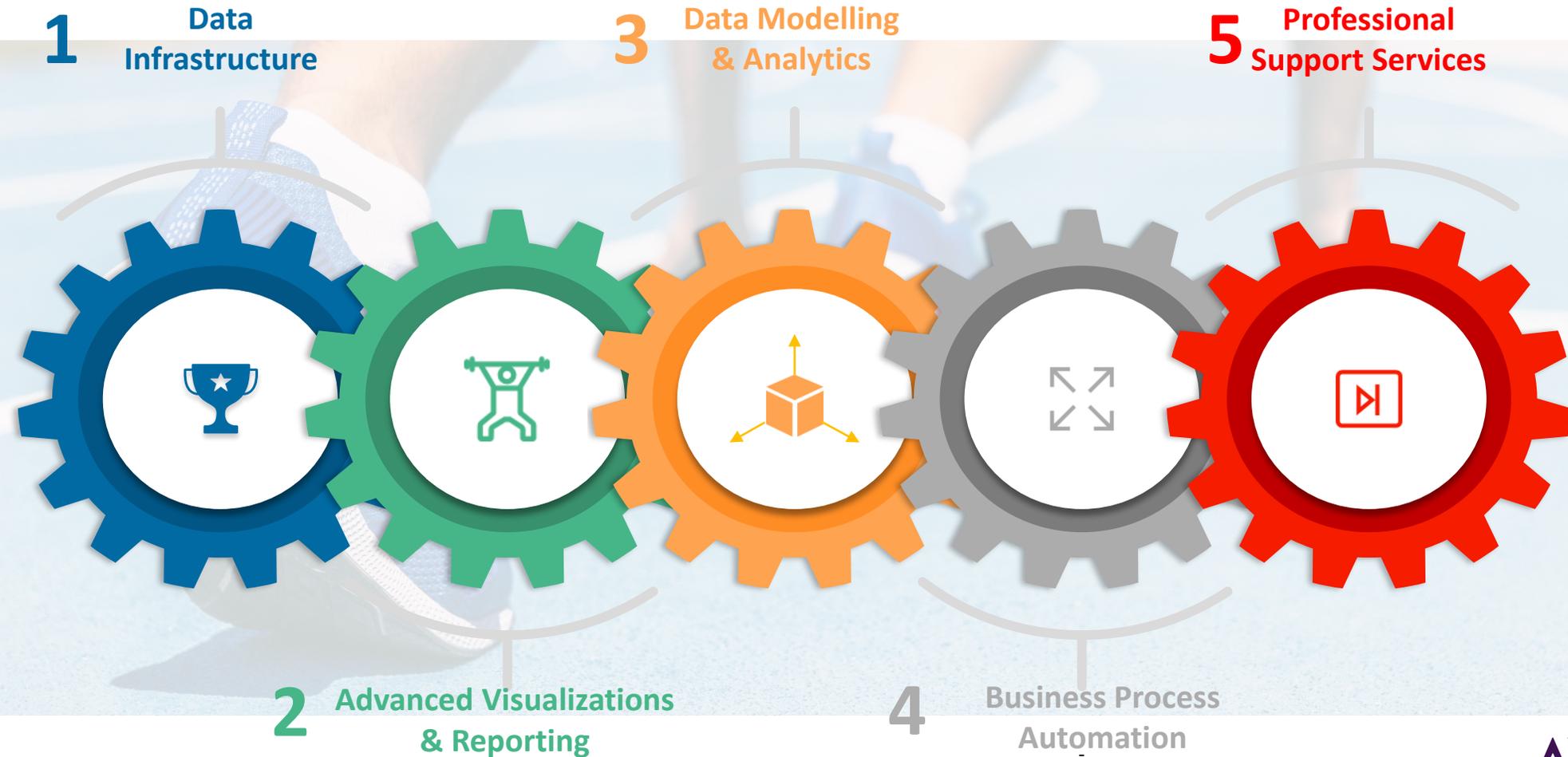
Cognizant

- Helps modernise technology, reimagine processes and transform
- Our consultative approach helps clients envision, build and run innovative and efficient businesses
- Headquartered in the US, Cognizant is ranked 185 on the Fortune 500



Who we are, what we do

Where we help our customers



Accelerate Data Infrastructure Deployment and Time-to-Value by Adopting DevOps Methodologies

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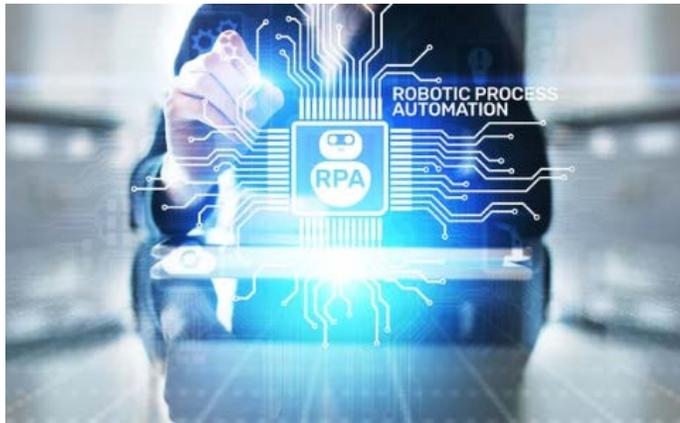
Customer Challenge

Increasing scale



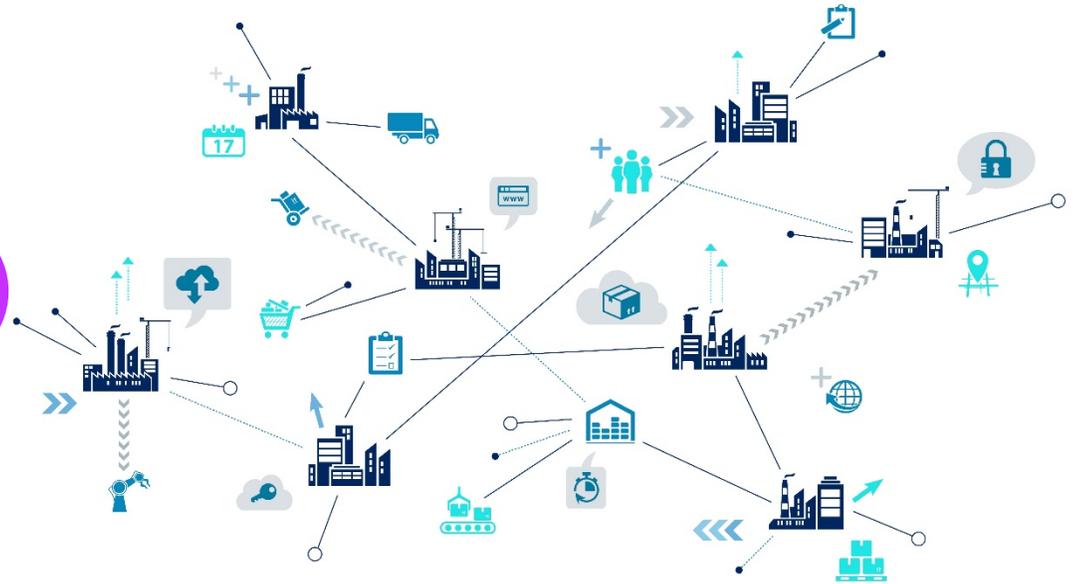
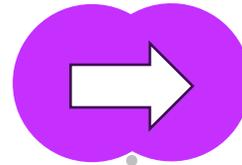
Customer Challenge

Increasing rate of change



The Data Infrastructure

Everything, Everywhere, All at once



MES

Process Automation

Building Automation

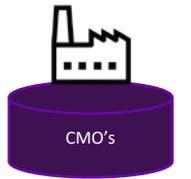
IPC Instruments

LIMS

IIoT

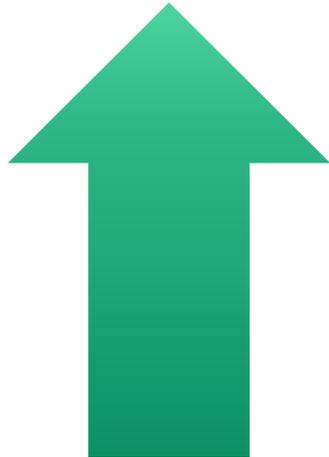
ERP

Scales & Printers

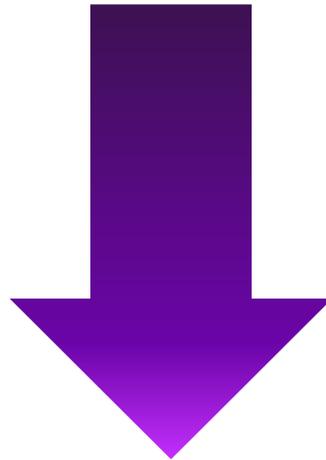


Organizational Goals

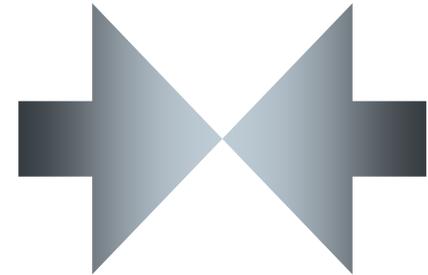
Increase
Speed



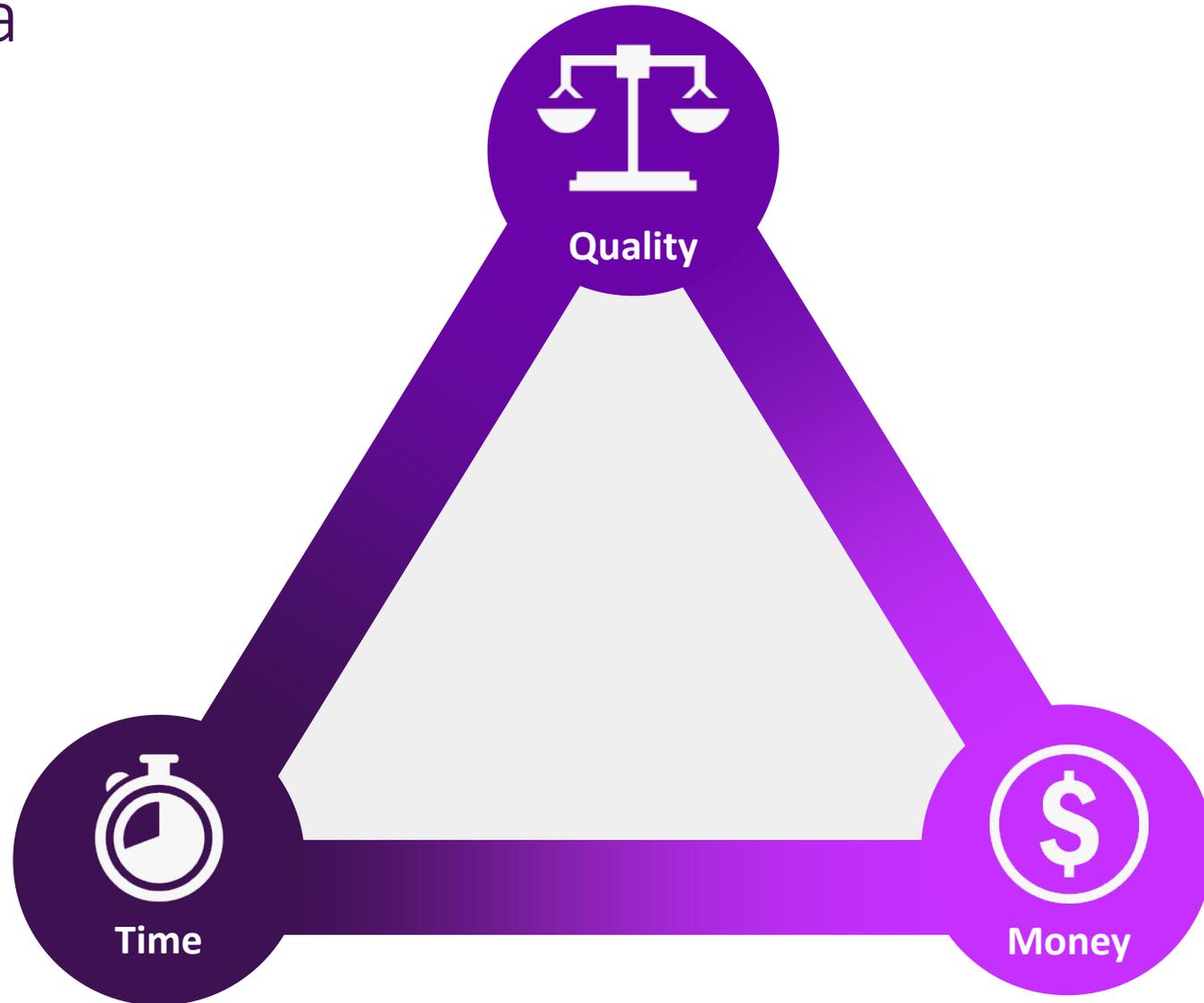
Lower Cost



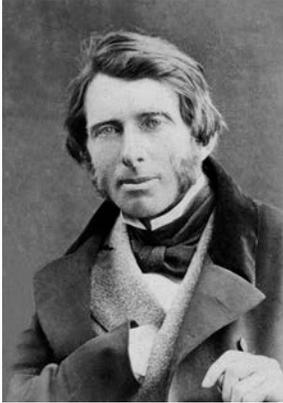
Maintain
Quality



The Dilemma



The Dilemma

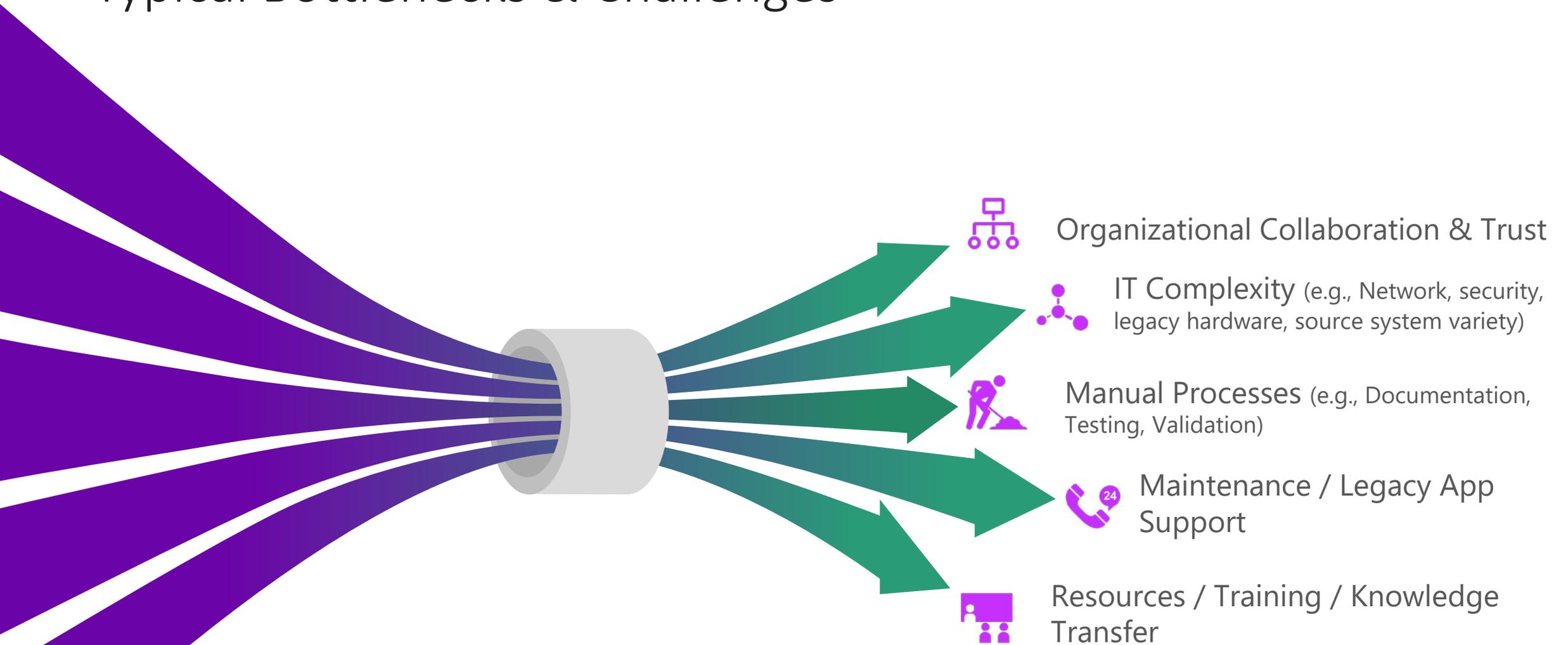


“Pick two” - *John Ruskin, 19th Century

* Allegedly. Refer to the [Common Law of Business Balance](#)



Typical Bottlenecks & Challenges



“You just can’t underestimate the power of showing up every single day and doing the work.”
– Kobe Bryant



Solutions

Vendors

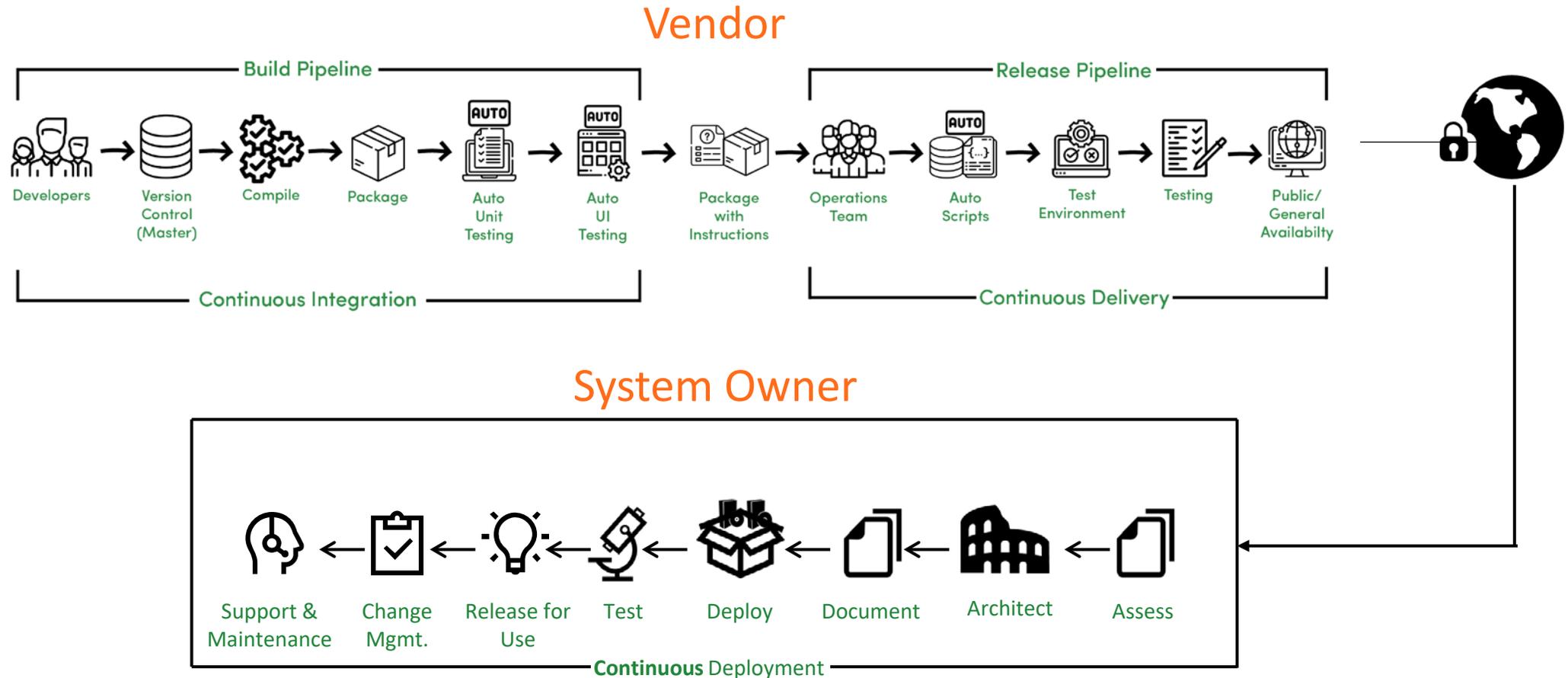
Software Released

System Owner



Get features + changes to users safely and quickly in a sustainable way

Continuous Integration, Continuous Delivery & Continuous Deployment



Start



Finish





Maintenance

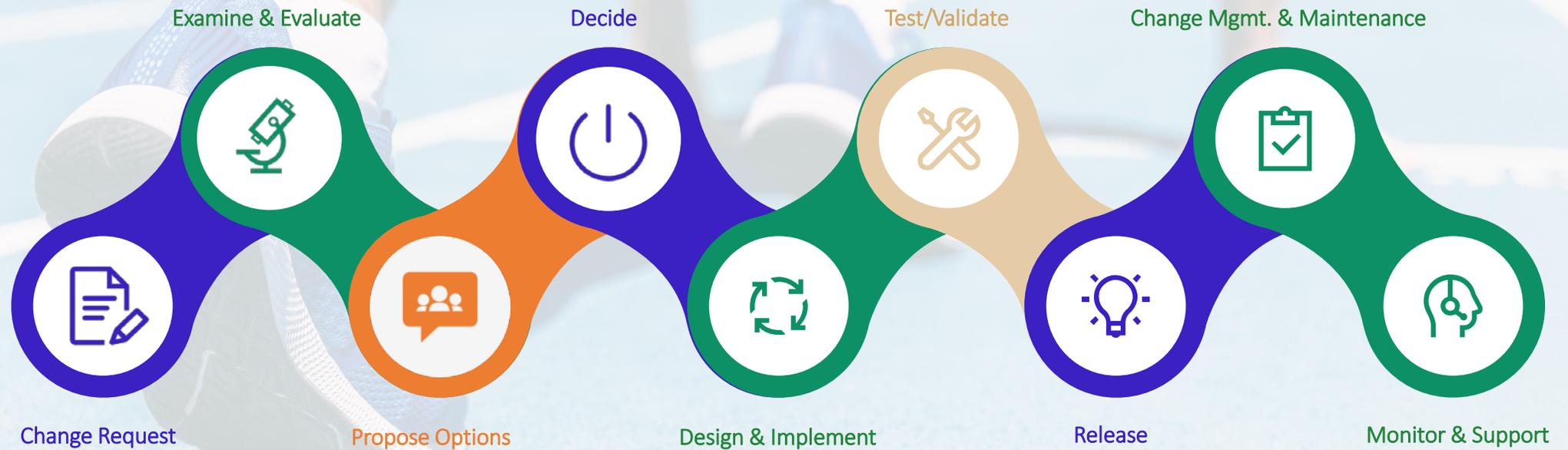
Knowledge Transfer

Manual Documentation

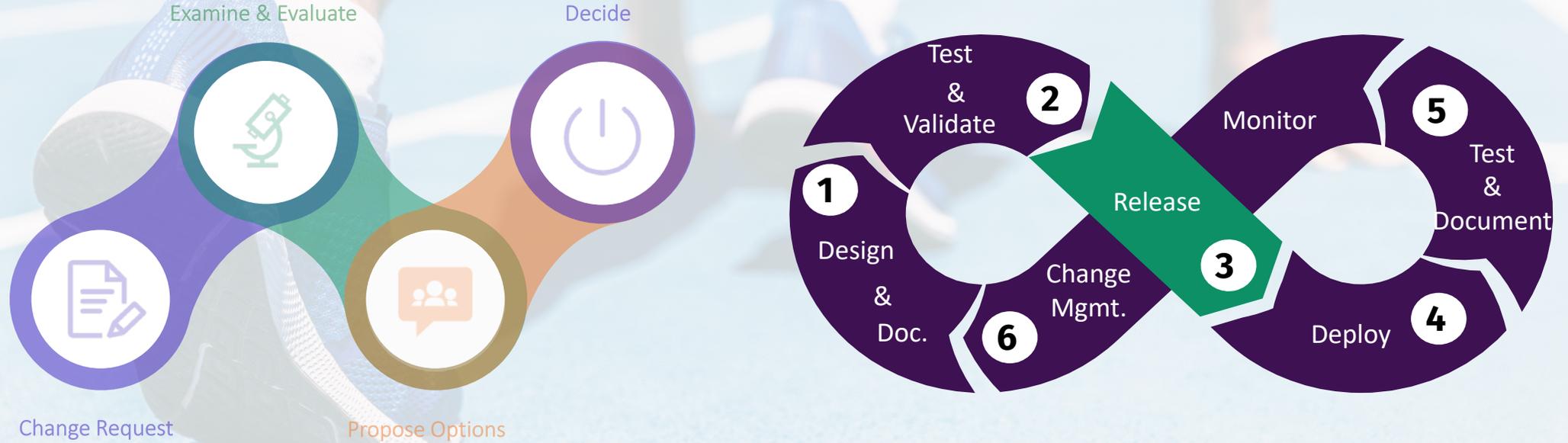
Manual Testing

IT Complexity

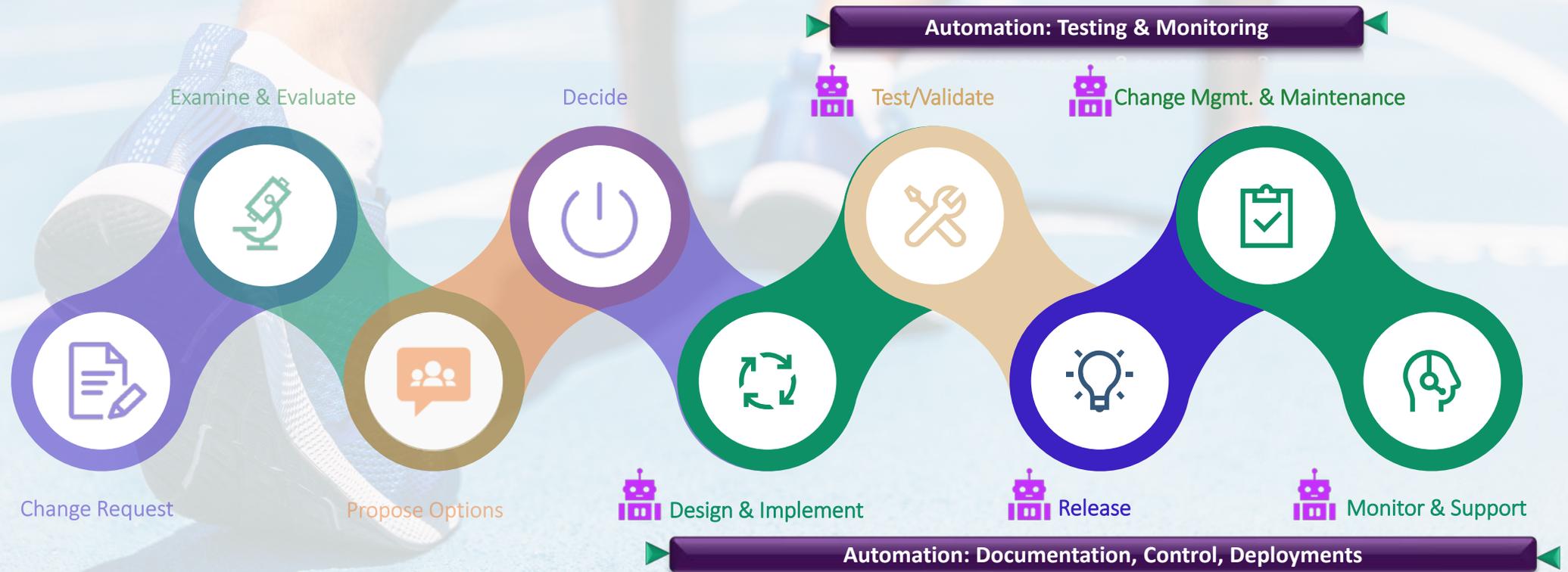
Typical SDLC Lifecycle



Future SDLC Lifecycle?



Starting the Journey



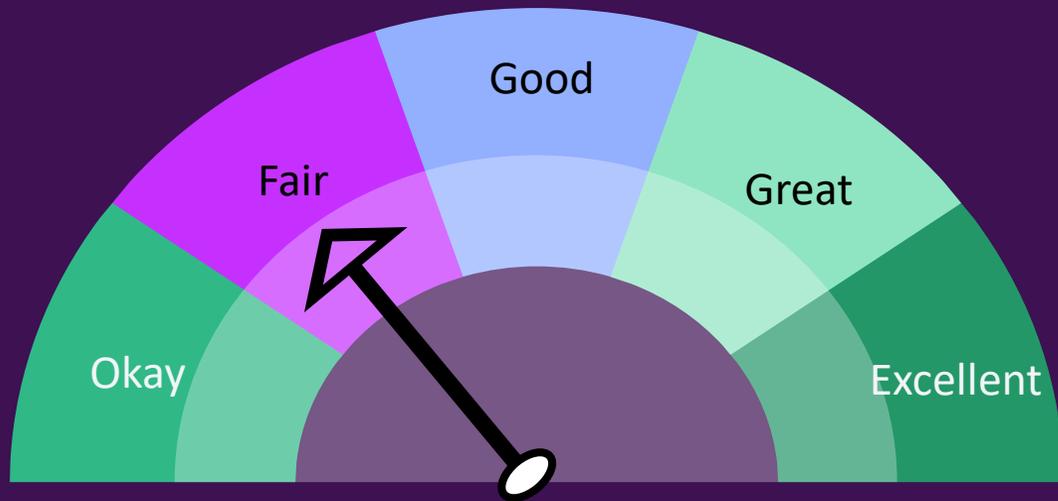


Define Success Criteria

Choosing our adventure



INCREASE Organizational Collaboration & Trust by through honesty and observability



Satisfaction

Define Success Criteria

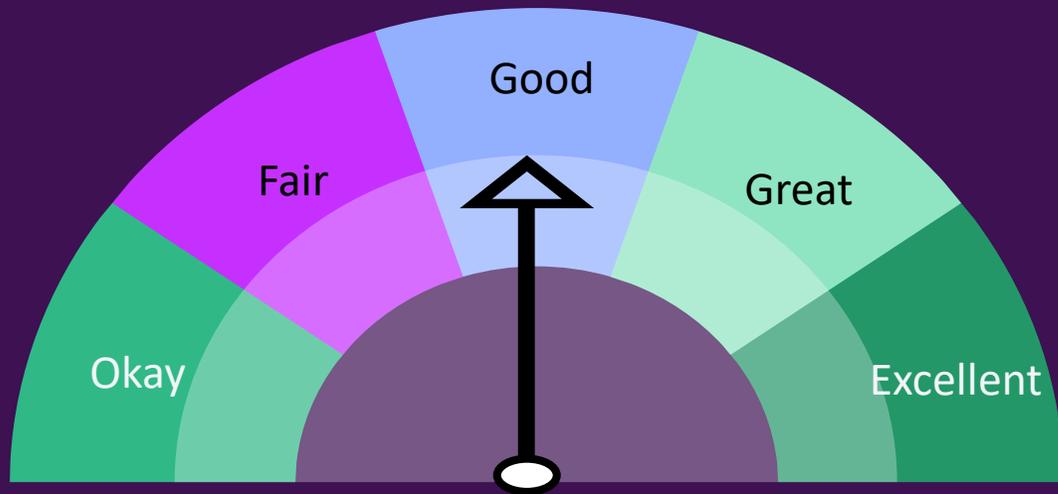
Choosing our adventure



INCREASE Organizational Collaboration & Trust by through honesty and observability



AUTOMATE testing the IT Complexity to increase teams' agility



Satisfaction

Define Success Criteria

Choosing our adventure



INCREASE Organizational Collaboration & Trust by through honesty and observability



AUTOMATE testing the IT Complexity to increase teams' agility



AUTOMATE the Manual Processes



Define Success Criteria

Choosing our adventure



INCREASE Organizational Collaboration & Trust by through honesty and observability



AUTOMATE testing the IT Complexity to increase teams' agility



AUTOMATE the Manual Processes



ENSURE backwards compatibility with Legacy Apps (empower support).



Define Success Criteria

Choosing our adventure



INCREASE Organizational Collaboration & Trust by through honesty and observability



AUTOMATE testing the IT Complexity to increase teams' agility



AUTOMATE the Manual Processes



ENSURE backwards compatibility with Legacy Apps (empower support).



ENABLE Knowledge Transfer & training by good documentation/coding practices

“Rest at the end, not in the middle” – Kobe
Bryant: Mamba Mentality

Automate Everything

Enabling DevOps

Automation is a key factor in adopting DevOps principals, so we've had to develop/adopt new tools.

These tools enable

- On-demand documentation (serialize to document/version control)
 - Beyond traditional limitations, with limited overhead (e.g. DCOM anyone?)
- Push button deployments (from central control or otherwise)
- On-demand validation/testing
- On-demand configuration drift assessments
- Faster time-to-value, greater trust, higher quality

Others work you should also check out

[Osisoft GitHub](#)

[Google GitHub](#)

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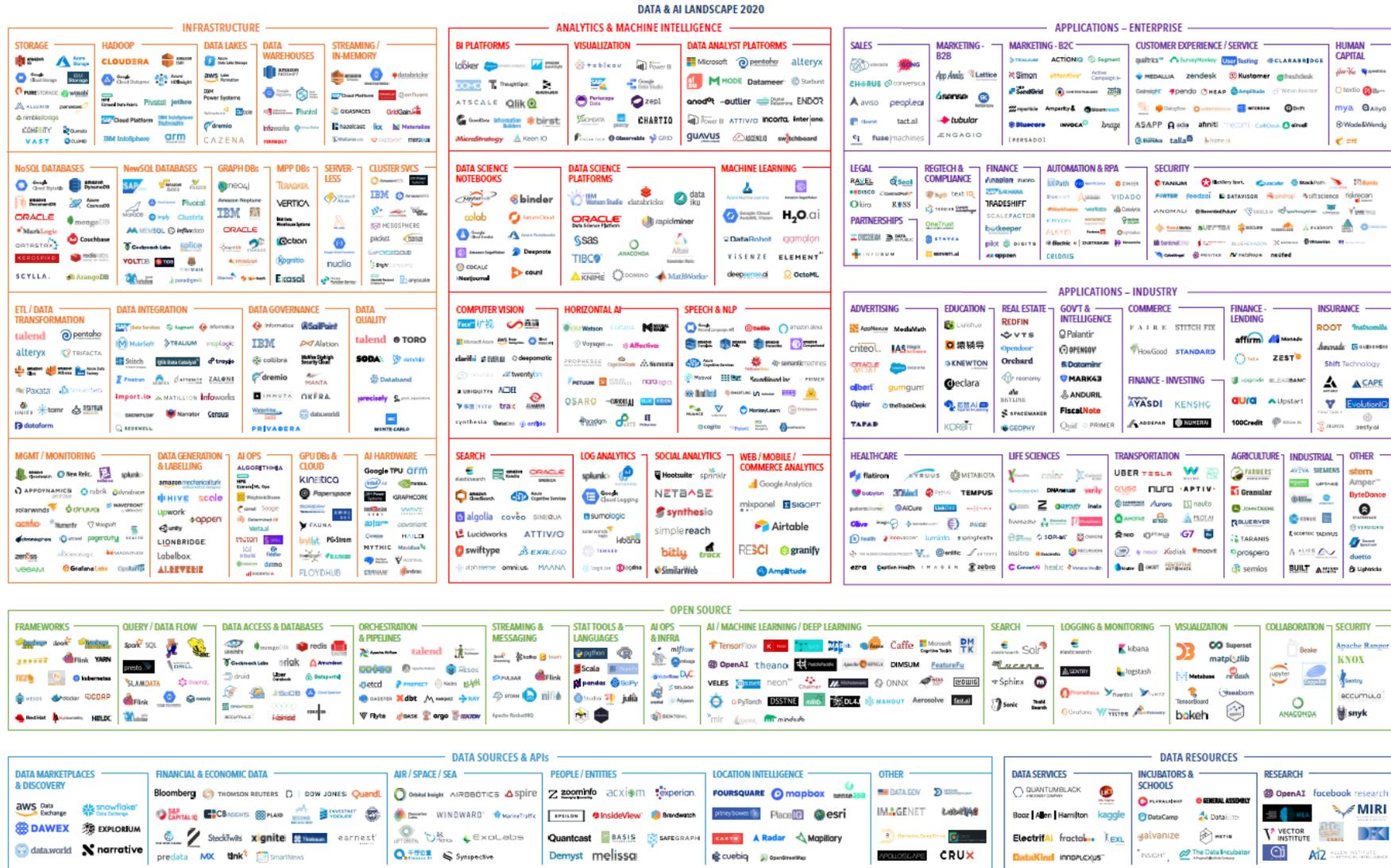


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*“Start by doing what’s necessary; then do what’s possible; and suddenly you are doing the impossible” – Francis of Assisi **

Tools

You can use technology to get the conversation started...



Version 1.0 - September 2020

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mattturck.com/data2020



Tweet



Kobe Bryant 
@kobebryant



Can't win a shootout with a butter knife [#letitfly](#)



Sam Sheffer  @samsheffer · Jun 9, 2015

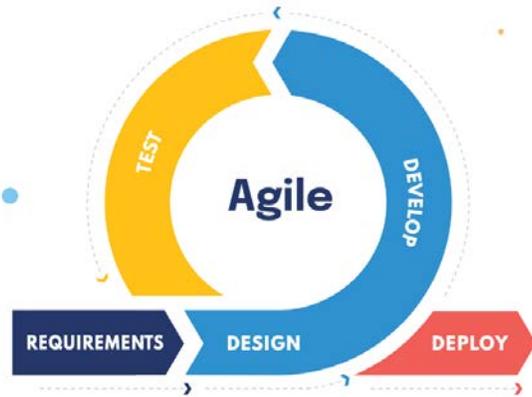
@KingJames is taking some very @kobebryant shots I love it — cavs looking and playing strong, 4th will be interesting nonetheless

9:31 PM · Jun 9, 2015 · Twitter for iPhone

8,651 Retweets 7 Quote Tweets 8,402 Likes

Process

... But we use process and hard work to achieve goals



FDA
CSV -> CSA



Standard for
DevOps

Some interesting Lessons Learned

Unknown unknowns

Replicating & Replacing Human Cognition with Cold-hearted Machines

- Time. Local, remote, time-zones and more
 - Precision (amount of digits), and Accuracy (how truthful)
 - Windows API ([Get Precise](#), [Get Remote](#)), and GPS Clocks and/or NTP/SNTP sources ([RFC4330 compliance](#))
- Solve legacy IT Complexity
 - E.g., DCOM, Local Policies, ODBC, and more require developing programmatic automation
- Distributed, silent and remote installations
 - Remote process escalation (i.e., run-as admin), file-system permissions, logging, feedback
 - Utilize alternative credentials / user-impersonation to authenticate to endpoints (e.g., SQL, PI, AD)
 - Do with or without software orchestration tools?
- Serialize into documents, deserialize back
 - .NET -> PowerShell -> Document (docx, json, csv, other)
 - Document (docx, json, csv, other) -> PowerShell -> .NET
- Human-Error handling – You can put anything in a document...
 - [Fuzzy-matching](#) to handle for simple spelling mistakes

Unknown unknowns

Replicating & Replacing Human Cognition with Cold-hearted Machines

- Measure Configuration Drift
 - Bring [diff](#) techniques down the infrastructure stack
 - Apply correction, or wait for approval ; augment [Desired State Config](#)
- Synchronize Data Streams, or develop new logic
 - Compare continuous data streams (e.g., OPC) with unsynchronized sampling creates challenges
- Integrating Orchestration and Electronic Testing tools
 - Out-of-the-box, upgrade or replace?



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CTO, TQS Integration

- <https://www.linkedin.com/in/damieno-connor/>



PLS VISIT US AT BOOTH #46

www.tqsintegration.com

Questions?

Please wait for the microphone

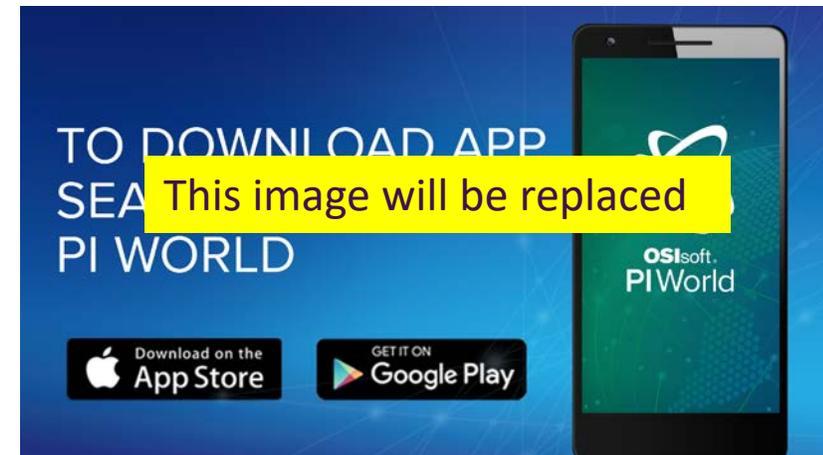
- State your name and company



Please remember to...

Complete the survey!

- Navigate to this session in the mobile agenda for the survey



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 TEŞEKKÜR EDERİM
 DANKIE
 TERIMA KASIH
 SPASIBO
 ПАСИБО
 GRAZIE
 МАТУР НУВУН
 ХВАЛА ВАМ
 MULȚUMESC
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 ТАКК СКАЛДУ ХА
 RAHMAT
 HATUR NUHUN
 PAXMAT САГА
 CẢM ƠN BẠN
 WAZVIITA
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 MISAOTRA ANAO
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 HVALA
 FААFETAІ
 ESKERRIK ASKO
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 DI OU MÈSI
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 TI БЛАГОДАРАМ
 СИПОС
 FALEMINDERIT
 ありがとうございます
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 СИПОС

References

Standards and knowledge leaders

Update from FDA on CSV Changes

USDM Webinar

<https://www.usdm.com/Insights/Webinars/Computer-Software-Assurance-Update-from-the-FDA>

IEEE 2675-2021

IEEE Standard for DevOps: Building Reliable and Secure Systems Including Application Build, Package, and Deployment

AAMI TIR45

Agile Guidance in Medical Device Development

Bootstrapping a DevOps Mentality

Patrick Debois

<https://skillsmatter.com/skillscasts/1811-bootstrapping-a-devops-mentality>

When DevOps Meets Regulation: Integrating 'Continuous' with 'Government'

Jez Humble

<https://youtu.be/STRpThSqKDk>

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ABOUT AVEVA

AVEVA is a global leader in industrial software, driving digital transformation and sustainability. By connecting the power of information and artificial intelligence with human insight, AVEVA enables teams to use their data to unlock new value. We call this Performance Intelligence. AVEVA's comprehensive portfolio enables more than 20,000 industrial enterprises to engineer smarter, operate better and drive sustainable efficiency. AVEVA supports customers through a trusted ecosystem that includes 5,500 partners and 5,700 certified developers around the world. The company is headquartered in Cambridge, UK, with over 6,500 employees and 90 offices in over 40 countries.

Learn more at www.aveva.com