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Automation at scale

Getting ready for
Level 4 automation

Part 1: Consolidating, simplifying and optimising the OSS
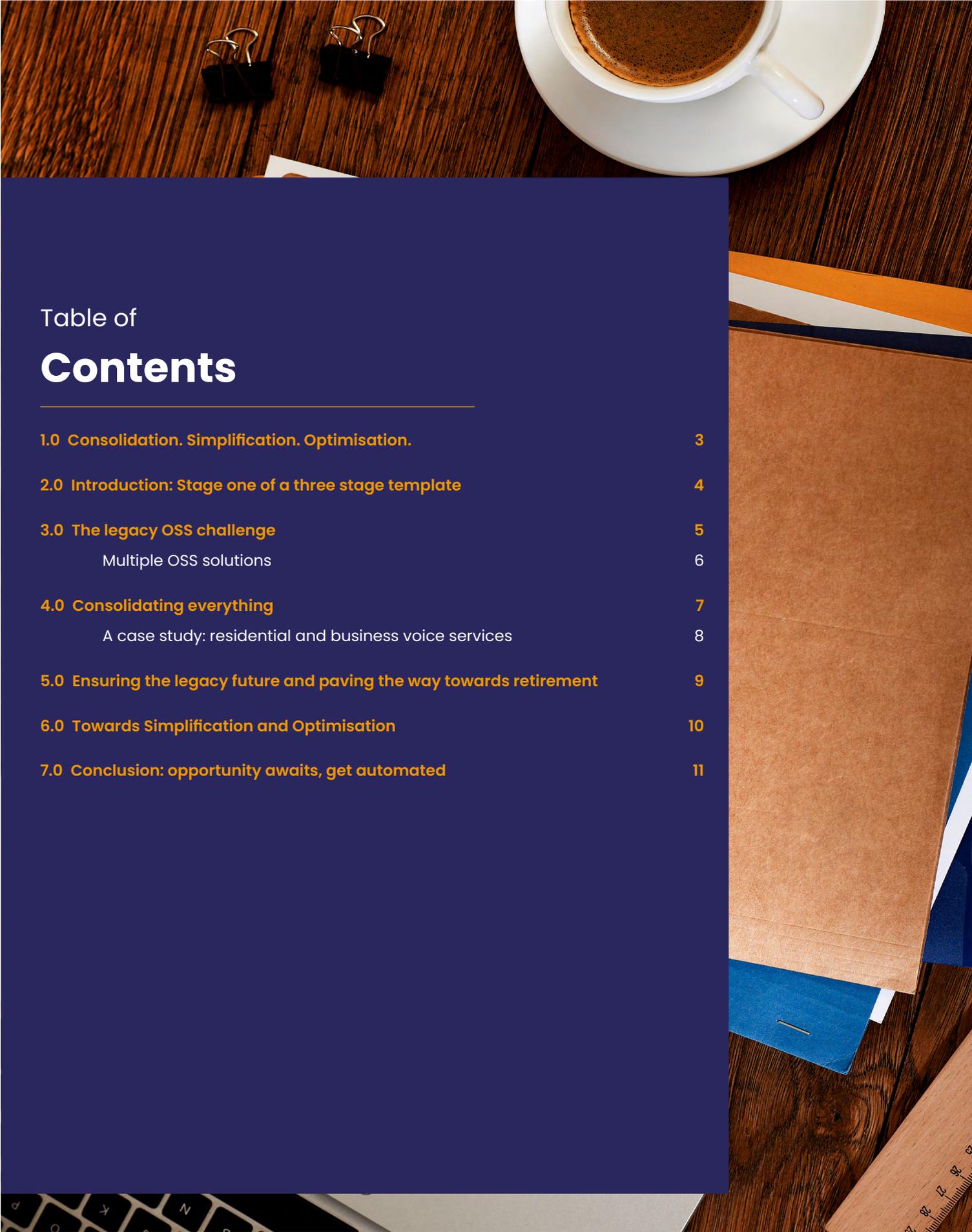
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"In this paper, we'll explain why operational automation and agility in the network and OSS domains (which are essential for 5G success) must be linked to automation in the BSS stack, and how automation can provide the ability to iteratively support evolving service management requirements and ensure compliance with all necessary regulatory requirements."

Summary

Consolidation. Simplification. Optimisation.

In this paper, we will outline Stage One of a Three stage automation transformation plan we often develop with Operators.

1. Consolidation

2. Simplification

3. Optimisation

Stage 1. Consolidation, by which we mean the process of integration, bringing legacy platforms and silos into the OSS – increasing their utility and ensuring that their strategic value is enhanced.

That allows benefits to be accrued today – in readiness for future retirement and/or reuse of those legacy solutions with the evolving framework. In turn, this enables processes to be decoupled from vendor-specific solutions and defined generically. In later stages, this provides the foundation of enhanced flexibility, dynamic adaptation to changing network infrastructure and operations, while also reducing risk and cost of ownership. Transforming the OSS will involve many pathways and parallel processes initially, so can be an exceptionally complicated task. It can create operational safety issues – from the loss of crucial know-how to creating network vulnerabilities.

Similarly, it can be just too expensive, which is the main factor holding back many CSPs.

This paper will unlock some of the secrets to success at Stage One – and show how operators can move from these foundations towards Stages Two and Three.

In this paper, we'll outline how operators can confront this challenge, using Stage One of a three-stage automation transformation template We Are CORTEX has developed for operators of all sizes.

We will cover Stages Two and Three in depth in subsequent papers. Here, we will focus on the crucial step towards consolidation – the process of integrating legacy platforms and silos into emerging OSS automation frameworks — increasing their utility and ensuring that their strategic value is enhanced.

Introduction

Stage one of a three stage template

All telecoms operators are striving to enhance automation across all their operating domains – edge, transport, core, OSS and BSS. This is a complex task that involves multiple parallel and sequential activities, and requires the alignment of many different stakeholders. The massive transformation underway will take time, even if the goal of achieving Level 4 or Level 5 on the TM Forum's six-stage model remains clear.

The transformation will, naturally, involve the deployment of many new solutions and technologies. However, almost all operators are faced with a significant challenge: their legacy platforms and infrastructure. It is fanciful to imagine that these can simply be retired en masse.

This OSS legacy supports live services and operational processes, many of which are essential to existing customers and will likely to continue to play their part for some time to come. Put simply, few budgets could possibly stretch to a mass retirement of such platforms.

In this paper, we'll outline how operators can confront this challenge, using Stage One of a three-stage automation transformation template We Are CORTEX has developed for operators of all sizes.

The template spans:

- Stage One – Consolidation

- Stage Two – Simplification

- Stage Three – Optimisation

We will cover Stages Two and Three in depth in subsequent papers. Here, we will focus on the crucial step towards consolidation – the process of integrating legacy platforms and silos into emerging OSS automation frameworks — increasing their utility and ensuring that their strategic value is enhanced. This stage allows immediate benefits to be accrued – in readiness for future retirement and/or reuse of those legacy solutions with the evolving framework. This paper will unlock some of the secrets to success at Stage One, providing a reliable, reusable framework to support transformation towards full automation – and to climb the TMF ladder.

> *"The scale of the challenge is well known to the industry. That's because many operators have, literally, dozens of such OSS systems, with many dedicated to particular services – a spokesperson from Telenor has been quoted as suggesting the real number approaches 200"*

The legacy
OSS challenge

For most telcos and operators, the TMF's autonomous networks model provides a roadmap towards fully autonomous network operations. Many have achieved Level 1 or Level 2, but taking the next steps to 3 and 4 — and, attaining the ultimate goal of ascending to Level 5 — is proving to be a stretch.

Operators are, naturally, eager to track and measure progress towards these goals because these are strategic targets. Some have undertaken self-assessment, using a framework provided by the TMF — the results of which were published at MWC 25 during the Autonomous Networks Summit[1]. Using different categories, CSPs provided their own ratings for their progress to date, allowing an average score to be calculated that indicates the level of automation achieved. For example:

Average level reached for:

- RAN Fault Management — Level 2.8

- Core Network — Level 2.5

- IP Network — Level 2.4

- Core Network Stability — Level 3.5

- IP Network Optimisation — Level 2.6

- Change Management — Level 1.9

As can be seen, there is good progress towards (and exceeding) Level 2, but going further remains an open target. That's because almost all operators are hampered by the same problem: dealing with their legacy OSS operational estate. Put simply, there are numerous challenges to overcome when integrating new automated processes with legacy infrastructure.

On the one hand, many operators can successfully transform their access, transport and core network, moving to new platforms and new generations of technologies to deliver existing and new services and capabilities — but on the other, the operational systems that support them have not kept pace with the service transformation.

While some operators may seek to replace these legacy platforms, this approach is both far too expensive for most, while also being impractical because of the often highly specific nature of the services and processes supported by legacy OSS systems.

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1 - *L4 is ON: Shaping the Future of Autonomous Networks Together", TMF during Autonomous Networks Summit 2025 at MWC*

Multiple OSS solutions

The scale of the challenge is well known to the industry. That's because many operators have, literally, dozens of such OSS systems, with many dedicated to particular services – a spokesperson from Telenor has been quoted as suggesting the real number approaches 200[2]. These remain in-service and often fulfil vital roles – supporting regulated or mandatory services, or providing support for key accounts, such as those in the public sector, for example.

This problem isn't restricted to the former monopoly operators – the PTTs. Any service provider that has moved from copper to fibre, or 3G to 5G will have similar challenges. These service providers may have evolved their own network, or acquired new networks that add to the complexity.

Indeed, in the latter case, they will now be trying to converge service offers – which means automations they may already have applied to next-generation assets in their original network will need to be applied to the new assets in order to secure the desired operational efficiencies promised by the M&A activity.

Of course, the legacy OSS estate will – eventually – be modernised or replaced, but that will take time and must be considered alongside other investment and transformation priorities. Meanwhile, where does that leave automation projects? Should the legacy be isolated and left behind?

The answer is no. It's tempting to focus on automation in the newer domains – for transport, RAN, service optimisation and more – but the fact is that the legacy cannot simply be ignored – and represents a chasm that automation must cross to accelerate the journey towards fully autonomous networks, because we can't simply retire all these platforms.

Indeed, operators that are leading the charge towards automation recognise this. They know that they cannot uniformly replace existing solutions with new. It's one thing to move from one generation of optical transport to another, or to move from a current IMS to a containerised, virtual version[3] ; quite a different matter to replace the multiple silos of, for example, billing platforms that are tied to individual services.

Instead, the most innovative operators are able to bring legacy assets into their growing automation framework and not simply rip and replace, which can lead to economic inefficiencies and growing costs. They leverage what they have to move forward alongside new investments. So, how can this be accomplished?

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2 - *https://futurenetworld.net/events/transforming-data-into-business-value-with-ai-and-automation/*
3 - *Which is still a difficult challenge, as operators that have been compelled to move from one IMS platform from a designated high-risk vendor to another from an approved supplier have learnt.*

Consolidating
everything

Integrating the OSS legacy with automations designed to enable operational transformation can be achieved. To do so means adopting automation solutions that can support the vast range of legacy interfaces to legacy OSS platforms, as well as newer interfaces that are exposed by the current generation of solutions – or which offer the flexibility to adapt to support any southbound interface from the past or future.

Such platforms allow operators to retain the legacy assets for as long as they are required — or when their removal or deprecation carries too many business risks — while also allowing you to modernise and derisk their operation — by, for example, bringing them into an updated security and governance framework, in-line with NIS-2 or the Cyber Resilience Act.

This is Stage One of the We Are CORTEX framework. It requires the connection of functional, reusable building blocks to interfaces presented by any element – including those from the legacy and next-generation OSS estates.

These functional blocks are then interconnected to create processes – enabling the transfer of information from one system to another, with bi-directional control to effect the desired automation as inputs and commands are transferred. Many automation engines support today's interfaces, such as HTTP REST and SOAP. But few support legacy interfaces, such as:

- SFTP/FTP
- SSH/Telnet
- SNMP
- TCP Sockets
- IMAP
- CORBA

In a pure play 5G network, REST is probably sufficient.

But if your network also includes 2G, 3G and 4G, TDM voice, different generations of transport and so on, together with their associated OSS systems, you need to be able to extend back over several generations of technology to bring such platforms into the evolving automation framework.

But, the CORTEX platform is agnostic to these, enabling connectivity to legacy platforms and for them to be integrated with automated processes, and not left behind. This integration also enables processes to be decoupled from vendor-specific solutions and defined generically.

In later stages (Two and Three in our template model), this provides the foundation of enhanced flexibility, dynamic adaptation to changing network infrastructure and operations., while also reducing risk and cost of ownership.

Transforming the OSS will involve many pathways and parallel processes initially, so can be an exceptionally complicated task. It can create operational safety issues – from the loss of crucial know-how to creating network vulnerabilities. Similarly, it can be just too expensive, which is the main factor holding back many CSPs.

A platform such as CORTEX can both automate legacy OSS solutions — with interfaces that cannot be understood by most automation engines — and also integrate them with wider automation processes, enabling hyperautomation, so they are not left behind as a cost sink.

A case study: residential and business voice services

Voice remains a foundational service and has evolved considerably in recent years. Most operators have transitioned from TDM to IMS-enabled voice for fixed customers, and from TDM to VoLTE via CSFB for mobile users. Some operators have been required to maintain all these successive generations of technology in parallel.

One operator, running a key national network that services both public sector and private sector customers, as well as residential users, had the problem of monitoring and automating service assurance across each of the voice networks it was required to support. Moreover, as voice is, today, an optional service for new customers that take fibre connections, connectivity and voice services were logically separated, even if each shares the same infrastructure.

Consequently, the operator ran multiple monitoring and assurance platforms, with each dedicated to a different set of solutions and management platforms in the OSS domain. Bringing these together into a single pane of glass while also automating responses to detected alarms would introduce significant operational savings. The solution needed to align with the ticketing platform currently in use – while extending to platforms that could be deployed in the future.

With CORTEX, the operator built a consistent, logical and physical view of the network, which allowed us to catalogue and, finally, to correlate all alarms, back to the individual component from which they were generated.

This was achieved for both the legacy TDM as well as the SIP network – and extended to the different VoIP solutions deployed. In a further iteration, this was extended to the contact centres, including related functions and components, such as voice recording, agent devices, IVR / auto attendant systems, auto-diallers, and many more – each with its own interfaces.

In practice, CORTEX automates the processing and handling of alarms, taking care of filtering and categorisation. This means that the conversion of alarms to tickets that require remedial action has been automated – 99.9998% of such alarms are now handled with no human intervention.

Today, the conversion of alarms that require tickets for remediation is 99.9998% automated. The operator can now handle over 400 alarms per minutes at peak times, and resolve 18 million alarms per month, while generating a much more manageable 3,000 tickets. For the national network – both business and residential, this means 216 million alarms / year.

What this means...

- 99.9998% of the conversion of alarms to tickets has been automated.
- A massive step change:
  - From inconsistent manual processes then
    - To 60 million alarms per month converting to 600,000 tickets, and
    - Now 18 million alarms per month converting to 3,000 tickets.
- 216 million alarms per year.

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Ensuring the legacy future

and paving the way towards retirement

So, legacy interfaces — irrespective of the generation — can easily be integrated with CORTEX to bring automation to legacy and orphaned service and OSS elements and silos, creating a consolidated future until such time as the legacy can be (gracefully) retired. It is true that today's solutions often support open, common APIs (such as those from the TMF), but the reality is that legacy solutions are unlikely to do so. Instead, we are back in the world of telnet, CORBA and the like.

We can't ignore these due to that gap; instead, we must deal with the interfaces they support and the infrastructure 'as is'. Many of these do not benefit from upgrade programmes to support new, common interfaces, so we have to recognise that there is a huge array of different formats and protocols to consider.

Of particular relevance to today's automation efforts is that fact that this can also be achieved without the deployment or intervention of AI, as the inputs and outputs from these OSS elements are largely limited to one or a selection of options. Some are purely deterministic – that is, this input generates this output as a response, while for others context and other data may be considered to select the appropriate action.

One simple example is an alarm that indicates that a broadband connection is out of service at a residential property. The consumer customer may call the contact centre to request help, at which point the customer care agent may remotely reset the connection or run a diagnostic test. However, the alarm could also be handled automatically, triggering each of the steps required to bring the link back to service – a process flow that may span several operations in the OSS domain, as well as several different systems.

CORTEX enables this to be automated, because it has the capability to connect to all of the available interfaces presented – and, crucially, can be adapted to new ones as the underlying infrastructure evolves, perhaps to a next-generation fibre link.

And this is an important consideration, because what happens to all those automations when, ultimately, the legacy platform is retired? After all, consolidation is a part of the desired automation, so the network can be simplified as part of the transformation goals.

It is for this reason that we need the concept of reusability. When you decouple processes and use strategic platforms like CORTEX, the automation isn't dependent on the underlying system — it is a means to an end. So, it can be reused to perform the same task with newer, enhanced — or just different — platforms.

Finally, note that, while many operators are plunging into AI investments, many are also encountering challenges of inadequate, unclean or badly structured processes and/or data on which to train their models. But, by deploying CORTEX, the processes can be corrected, enabling structured data to be captured in readiness for the future deployment of AI for the extension of existing automations to the hyperautomation domain.

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1 - https://rethinkresearch.biz/report/network-slicing-market-forecast-2023-2030/
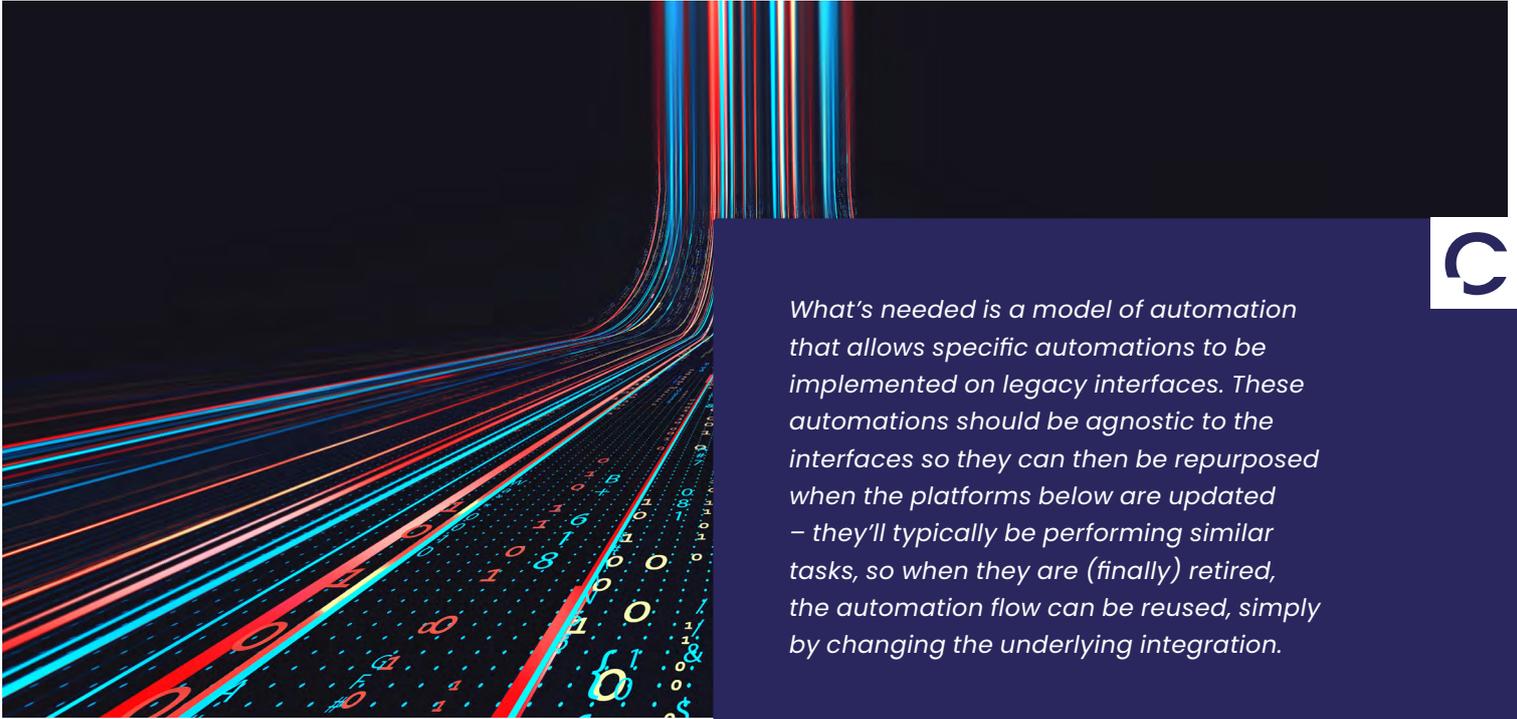
What's needed is a model of automation that allows specific automations to be implemented on legacy interfaces. These automations should be agnostic to the interfaces so they can then be repurposed when the platforms below are updated – they'll typically be performing similar tasks, so when they are (finally) retired, the automation flow can be reused, simply by changing the underlying integration.

Towards

Simplification and Optimisation

Stage Two (Simplification) involves retiring assets or replacing them with new solutions. The reusability referred to in the preceding section means that the automations developed in Stage One will not be wasted. From the processes and intellectual property you have decoupled and distilled, the improved decision-making models this can lead to, and the automations and agents you have developed, everything can be retained.

This then ensures that everything is then primed for Stage Three: Optimisation. Both new OSS platforms and the existing investments are protected and can be harmonised. With new ways of working, a fully documented and contextualised OSS, innovation can be rapidly followed, securing shorter time to value and opening the network for new services and partners — because they can be onboarded into processes that have already been enabled.

We Are CORTEX is a partner that gives you the reusable tools and capabilities to automate anything – from orchestration to process management. They come with the ability to evolve — as your customers and networks evolve — and are backed by knowledge sharing and transfer across your teams – so you can take care of future automation and orchestration challenges.

> *"Network slicing and B2B service automation and agility is a rapidly evolving landscape...Currently, there's a tool gap that means operators can't yet confidently embark on such a journey. Fortunately, We Are CORTEX can offer a platform that supports such a complex environment."*

Conclusion

opportunity awaits, get automated

The legacy OSS estate constitutes a widely recognised problem that could undermine or even jeopardise strategic moves towards automation and transformation, providing an obstacle to crossing the chasm to Level 4 or 5 on the autonomous networks journey. However, there is a solution.

What's needed is a model of automation that allows specific automations to be implemented on legacy interfaces. These automations should be agnostic to the interfaces so they can then be repurposed when the platforms below are updated – they'll typically be performing similar tasks, so when they are (finally) retired, the automation flow can be reused, simply by changing the underlying integration.

This model protects investments – it means that operators can bring legacy platforms into their automation frameworks, benefit from the advantages that they bring across different domains – and advance towards the next step on the automation ladder.

It also means that the resulting automations can be recycled when the solutions with which they interact are, finally, retired or consolidated into fewer platforms – so the initial investment is protected and preserved, because the automation flow can be reused.

This dynamic adaptation allows the legacy problem to be tackled, head-on, spreading automation both in practice and as a discipline, while ensuring continuity for automated processes that evolve with the underlying network architecture and components. That's what We Are CORTEX offers – a uniquely flexible approach to automation and hyperautomation that extends to the legacy and future domains, while paving the way for the introduction of AI, as required.

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