Business Paper
Service Interaction
The Bridge over Troubled Water

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OpenCloud

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The Bridge over Troubled Water

Foreword from Kris Kimbler

Communication Service Providers (CSPs) face several challenges caused by growing saturation, falling prices for core services and increasing pressure from Internet players. Even very rapid progress in the telecom technologies can create issues and often leaves the CSPs with difficult and risky choices. And on its own can sometimes create more problems than solutions.

The story of IMS (IP Multimedia Subsystem) is probably the flagship example of such a problem. The IMS promise was to rapidly bring service providers to all-IP networks, decrease operating costs and enable great service innovation. As we know none of this happened, instead many service providers got disrupted and confused. Even in the case of LTE and WiMAX (4G wireless technologies) that are the hottest topics now, CSPs are getting cautious in adopting them quickly as the business case and the market demand is unclear.

In this era of this technology hype, a few facts are often overseen. All of the new investments in the mobile systems in both emerging and mature markets are primarily based on 2.5G and in a few cases, 3G technologies. This means that five billion mobile subscribers in 2011/2012 (and probably for another 5 to 10 years to come) will be still using telecom infrastructure based on traditional TDM and SS7 standards rather than IP-based networks. During this long transition period to all-IP, the following issues will still need to be addressed:

- Lack of flexibility in service composition in the legacy networks
- Delayed adoption of all-IP networks (extended life span of legacy networks)
- Complex and problematic service migration from legacy to all-IP

> *"This means that five billion mobile subscribers in 2011/12 will still be using telecom infrastructure based on traditional TDM and SS7 standards… "*

These facts create a new challenge for the CSPs. The existing 2.5G and 3G networks do not allow the flexibility of service composition and service bundling enjoyed in the Internet. In consequence Mobile Service Providers have difficulty offering more advanced voice and messaging services to their prepaid customer base in these turbulent times and is especially problematic for enterprise market segment.

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There is however an emerging solution that can help CSPs to manage this problem in cost efficient manner without upgrading their core network elements or migrating to all-IP. Its name is Service Broker. It enables flexible composition and real-time orchestration of different value added services in one session and overcomes traditional problems with “feature interaction” through behaving as a focal point within the network.

Technically, a Service Broker can be seen as a mediation component bridging Service Delivery Platforms, Telecom Application Servers and legacy IN Services with core network elements using standard signalling protocols. A Service Broker is fully transparent so existing services do not require upgrade or modification. It does as the title of this Paper suggests, provide a bridge between networks and services that are often flowing in different speeds and directions at any one point in time.

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Part One: The Stranded Operator

Navigating towards terra firma

In the first in our series of business papers, 'The Stranded Service Provider', we discussed the precarious position today's CSPs now find themselves in – being caught in an inflexible TDM past while shooting for an all-IP future that is looking increasingly out of reach.

This second paper moves this discussion on, investigating the opportunities of bridging the TDM and IP worlds through the introduction of Service Broker solutions.

Existing TDM networks offer little in the way of service differentiation. Built on proprietary kit, by a select cadre of Network Equipment Providers (NEP), and offering a very similar range of services, competitive advantage is largely gained by clever marketing, increasingly large voice bundles and handset subsidies. The SS7 world is far less flexible then IP world. The limitations of SS7 make it difficult to create new services by bundling existing ones and even to offer complete service portfolio to prepaid customers.

But then suiting up for the 'IP revolution' is no sort of answer either. The economic climate has put pay to realising this dream for the next five years at least. And even so, the advent of all-IP doesn't entirely eliminate the threat of the IP bit pipe when vision becomes reality – whenever that may be. Different markets also have different challenges, in mature markets it is to migrate to All IP and to compete with Internet players, whereas in the emerging market is to offer VAS to prepaid customers.

But perhaps there's a third way – an opportunity for today's stranded Service Providers to bridge the gap between the old and new?

Like so much else, we must look to the Internet for our inspiration. Setting aside business models, the internet has been tremendously successful as a platform for innovation with the much of the value coming from a number of leading applications from the likes of Facebook, Google and Amazon. Individuals, communities and businesses can drag-net the web for a whole host of content, then 'mash it up' to create new and exciting applications that add real value. This can happen because most applications are freely shared and open enough to assure simple and rapid integration.

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This idea of service broking could be the route back to the mainland that telecoms providers are looking for. Combining old and new world services to create high volume applications - that play to the person to person communication strengths of the telecoms networks - is a compelling idea. Adding more detailed presence data to a legacy voicemail application - the old with the new - is one quick example. Or how about bringing VPN connectivity (previously only on offer to business customers) into the pre-pay world, and again adding location and presence data, to enable a host of new mobile social networking communities?

> *"Combining old and new world services to create high volume applications - that play to the person to person communication strengths of the telecoms networks - is a compelling idea"*

The good news is that the move to IP has seen more 'internet savvy' engineers move into the telecoms fold – exactly the guys who are innovating on the web and blending online applications out-of-hours. And this vital resource has a very significant role to play.

So, if we have the skill and the capability, all that's needed is a little imagination. While not abandoning their obligations to ensure 24x7 service availability, network operations departments have an opportunity to create new services in a relatively risk-free environment. Marketing departments, meanwhile, are able to sell a new range of differentiating services rather than having to fight on bundles – thanks to a more flexible service layer.

Enhancing legacy services with NGN attributes such as location and presence can add very significant value if the CSPs are able to utilize newly found Java development skills. The resultant applications, meshing old and new world services together, provide a quicker escape route. A route that solves the differentiation dilemma and allows providers to compete on service innovation and delivery rather than being forced to play the 'my bundle is bigger – and cheaper – than yours' game.

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Part Two: Blended Benefits

Networks in the Mix

Despite fervent attempts by the NEPs to transport customers to an all-IP future, the reality is that TDM networks will remain the mainstay of Operator infrastructure for some time. But IP is here, at least in a limited form, and operators are understandably keen to make the best use of these new IP capabilities and gain some return on their investments.

> *"the reality is that TDM networks will remain the mainstay of Operator infrastructure for some time"*

This creates a blended environment, where operators must not only manage multiple networks (2G, 2.5G, 3G, IMS), but will somehow have to offer a unified set of end-user services across these channels. And they need to do so quickly because basic services are becoming ubiquitous (Voice, Prepaid, SMS) and ARPU is under attack.

This new mixed up TDM/IP world requires a solution that can blend together the best of the old with the innovation of the new to create an even more compelling proposition.

Business Issues of Blending

Up to now, there has been no simple way of blending together TDM and IP capabilities. It's not just the technology; it's the business and organisational issues too. We've seen conflict between internal IP and TDM teams – neither wanting to make it easy for each other to drive new revenues from their investments. This is, of course, about role protectionism and favours no-one but the competition and new WiMAX and VoIP providers.

One option gaining increasing traction is the idea of Service Brokers - technology that reaches out to both GSM and IMS deployments and allows the creation of new converged services (by simply writing a script). While not a new idea, its growing popularity may well herald a new dawn of technical collaboration, that will open up the network and allow the sharing of IP and TDM assets for the good of all sides.

Going Open

While other approaches to opening the network to stimulate innovation such as the "GSMA's "OneAPI" seem to suggest this as a way forward, there remains the question of deciding 'how open' to be without giving away too much value.

Happily, by opening up the network rather the application layer to innovation, Service Broker side-steps this knotty problem. With the 'Open Service Broker', IN Service Layer engineers can compose new services by writing simple scripts using a simple

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Graphical User Interface (GUI), while service composition and orchestration doesn't require specific programming skills...so value can be kept in-house.

There's good news in the core too. Services can be created using combinations of SCP and SIP Application Server hosted services. The interaction logic (executed in the Service Broker) is separate from the service code ensuring baseline services remain untouched as the Service Broker interacts through intercepting the signalling rather than interacting with the core application logic. No change to the existing services is required and users see no change in existing service behaviour.

"With the 'Open Service Broker', IN Service Layer engineers can compose new services by writing simple scripts using a simple Graphical User Interface (GUI)"

Future-Proof

Service Broking allows CSPs to maximise the return on investment in existing networks and services, while removing the barriers to future innovation. New networks and technologies can be embraced while eliminating impact on subscribers during migration.

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Part Three: Service Interaction Explained

Understanding Service Interaction

Service Interaction capabilities allow operators to selectively trigger and run multiple services on a single network trigger. Service Brokers sit between the network and service layer and blend together services by managing the signalling interactions between. In effect, the network appears as though it is interacting with a single service, while the service-interaction layer appears like the network. The Service Broker then manages and coordinates the signalling between each individual service to create a new, combined service.

Service Brokers support multiple use cases. The first one being to enable IMS subscribers to access services in the TDM domain (IM-SSF). This means that Operators can migrate subscribers to IMS without needing to replicate the services that already exist on their IN platforms through existing service layer investments, meeting the needs for service continuity, service migration and user experience. The second example (Reverse IM-SSF) enables Operators who have already made investments in IMS Application Servers to offer these services to TDM connected users. This assures additional revenues can e gained from IMS infrastructure ahead of subscriber migrating to the IP network.

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The third example is managing service interaction across two or more service layer platforms (or where two or more services are hosted on a single, common platform). This function is defined as a SCIM (Service Capability Interaction Manager) for IMS networks in 3GPP TS 23.003. Although the term SCIM originally referred to an internal service interaction function taking place within a SIP Application Server, it is now used much more generically to apply to service interaction both within and across TDM and IP networks - and when describing a mix of capabilities hosted in both networks. Generally, it is easier and more inclusive to use the terms Service Interaction, Service Broking or Service Composition, as SCIM may be understood by some as only applying to IMS networks.

So why does Service Broking enable innovation? Quite simply, because Operators can create new services easily and quickly. And in a world where halting ARPU decline is of paramount concern, speed is of the essence. It also provides the first step to migrating to a horizontal service layer architecture – and it can do this today without the need to identify what may or may not be the preferred network architecture for the future.

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Part Four: Driving Innovation

Of course, being able to do it, and actually doing it, are two very different things. Service creation within the telecommunications industry has historically been measured in months and years. It was unusual to see a new service take 18 months from 'concept to consumer' so you had to be damn sure it was going to be successful to begin this process.

In today's internet world, such lead-times are simply not acceptable. Assured success, meanwhile, is not the only criteria. Consider Apple's Apps Store, in less than 2 years, over 65,000 applications have been developed. Most are free, some are more popular than others, and some are rather unsuccessful. But that doesn't really matter, because those services that have proved popular have been replicated, updated and improved, while those less so, have been deleted. This is the internet world we're talking about; rapidly develop applications, get them to market and see which ones work best.

Such a strategy has been, until late, unthinkable (and indeed impossible) in the telecommunications world. But the anticipated rapid move to IP has turned the telecoms engineering community on its head. SS7 experts are being replaced by a new breed of engineers. They are internet savvy, create and share content, they know the hottest applications and they choose the 'coolest' devices. Outside work, they know how to get the best from their IP networks and 'mess about' developing on the web for fun. They have studied new world engineering practices such as IP and Web protocols, are conversant in Java, tend towards open source and are, in the main, innovators.

Innovation from Within

Suddenly, connecting marketing and this dynamic new engineering community doesn't seem so out of place – particularly if operators are able to create more open platforms for development. It is, of course, impossible to replace the underlying protocols and platforms that CSPs have spent years investing in. However, through Service Broking, they don't have to. They can create an open service layer that bridges the IP and TDM worlds, and allows product innovation to thrive.

These same engineers who build web applications by night can now do the same by day. They can create new composite services across previously disparate and isolated infrastructures. And they can do it using the core skills and knowledge they have today.

> *"These same engineers who build web applications by night can now do the same (in telecoms networks) by day*

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This is the concept of 'innovating from within', and an answer to the question about just how CSPs retain their core value in an increasingly competitive (and open) market. Service composition is quick and simple. New services can now be rolled-out to mass markets without the need for major network upgrades or major corporate decisions on network strategy. And it can be done so without risk of failure; if applications don't work, learn from them, improve them, and discard the old ones.

Expert opinion: Kris Kimbler

In mature markets, many CSPs already started the process of migrating to all-IP networks and IMS (or pre-IMS). They offer IP telephony usually bundled with Internet access and IPTV. Also many new entrances and cable operators offering Triple Play are now investing in IP infrastructure.

Even though IP networks offer a great level of flexibility, similar problems with service composition occur there as well. Different services can be implemented on different Application Servers and thus their composition and orchestration requires a similar solution to Service Broker. In the SIP/IMS world there is a standardised component known as SCIM (Service Capability Interaction Manager) that mediates and orchestrates services running on different SIP Application Servers.

CSPs migrating to all-IP and IMS face significant issues with service continuity. They not only have to migrate their subscribe base to the new IP-base service infrastructure, but assure that the existing services will be available there as well. They either have to recreate the legacy services in the SIP/IMS platforms or enable these services through a kind of signalling gateway usually referred to as IM-SSF.

Server Brokers enable CSPs to solve all of these problems through a single platform, however disparate their current network and service layer architectures appear to be, Service Brokers provide a robust bridge that will need to be crossed back and forth many times – both now and in the future world of the all-IP network.

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Part Five: The Blended Service – Use Cases

Something old…

While not a new concept, a perfect storm of circumstance has seen renewed interest in the Service Broker proposition. Where mass IP penetration may have made the technology redundant outside of its original, more restricted IMS use case, today's reality is quite different. Stalled IP roll-outs, an unstable economic environment and ever decreasing consumer loyalty have proved the catalysts for Service Broker adoption.

Something new...

By allowing CSPs to offer a new set of common services to prepaid and contract subscribers - something impossible due to the limitations of the design principles of SCPs - Service Broker now has a significant role to play.

In terms of use-case, this could manifest itself in enabling prepaid users to access a single service built from components held on two or more platforms – for example, combination of Home Zone + VPN + Prepaid, supplemented with a set of location based routing preferences. The consumer benefits from a wider range of (more compelling) services, while the CSP is able to create a higher value bundle price for each of the multiple service components.

Something borrowed...

In a move reflecting the internet world, popular services can be rapidly mashed together to create a compelling application proposition to the end user. And because it's simply a matter re-using existing capabilities in the network, these can be built and deployed faster, and in a highly cost effective manner without having to invest in high cost Service Delivery Platform (SDP) solutions.

Consider the opportunities offered by social networking. Having seen phenomenal growth over the last 5 years, being an active member of an online community is very much the norm for significant demographic groups...and not simply youth audiences. This is group membership on a massive scale - in a more interactive and peer to peer way than operator portal ever were. The opportunities for participation, if properly unlocked, are huge.

> *"being an active member of an on-line community is very much the norm for significant demographic groups…and not simply youth audiences"*

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Legacy problems of segmented service and payment infrastructures inhibit operator's ability to play here, but Service Broking could be the key to inter-linking platforms and applications, to build true community-oriented services by bridging between these often disparate worlds. This is particularly significant as the world moves towards prepaid as the global payment standard. With no contract to lock them in, customers need a damn good reason to remain loyal. Bundling a package of services that meet the very particular needs of specific communities - offering voice, messaging, data, along with preferential group tariffs or price bundles - may give them reason enough to stay…particularly if other community members do too.

It's perhaps too early to say exactly what these services are right now, but the concept of creating a package of services targeted a defined community sounds compelling enough. The concept is already proven by what's happened on the web.

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Part Six: Vox Pops

How far can blended services world rescue the Stranded Operator?

Comment from Marlon Bowser, Managing Director, HTK

"The inevitability is that customers have to continue to invest in their networks, even in a downturn. Failure to invest will main failure to survive. Even if right now, the future is unclear, the Telcos know they can't continue to compete on the services they have today. So change is important. The key benefit change brings is agility. Agility (or lack of) is a real problem for the Telcos, often not being able to introduce new services for 12 to 18 months as they wait for major service layer or network infrastructure roll-out programmes to address the inter-operability constraints that are common-place in today's networks. Service Broking overcomes this problem as these products are slotting in between the network and service layer where the interoperability problems are already solved by standards based protocols. This allows the Telcos to bring new services to a much broader audience in shorter timeframes than is possible today."

Comment from Tereza Borges, BSS Integration Global Head, NSN

"Many operators today are afraid of the financial risks that embarking on major infrastructure change-outs can often bring and their reaction to this is to often take a more conservative approach to investment. They already recognise the transition to all-IP networks will take longer than originally thought and the more conservative approach now being taken can only cause to extend this window. This extended period of transition calls for a solution that can not only bridge both network domains, but one that also allows for a controlled service and network evolution plan. Operators will need to make sure existing services are not disrupted at the same time they are introducing new services. They will also need to manage the complexity involved in migrating users across to the new networks and continue to provide the same service experience. The answer to these challenges lies in providing real-time service interaction – the primary function of a Service Broker - and it's something we expect to see gain new momentum in the market-place."

Comment from John Logsdon, CEO, NetDev

"It was clear back in 2004 that TDM and IP networks were going to co-exist for some time to come and there was a need for products and solutions to bridge both networks. Investments in TDM technologies are not going to be thrown away overnight. No one is going to embark on a rip and replace strategy right now. Certainly, it seems like the market's now coming round to value their investment in TDM as it still remains a robust technology. There isn't a one-size-fits-all for the Telco world, but there are a number of steps you can take in reducing the cost and complexity of moving to the next environment. Nowadays, investments in creating new service layer architectures need

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a strong business case and cannot be justified on a single point solution. This stifles innovation and creativity. The way round this is to start investing in technologies that enable new services to be created by joining together for example existing pre-paid platforms with a VPN application such that traditional voice and messaging services to address social and community networking opportunities for all users, not just post-paid."

Comment from Ian Scales, Managing Editor, Telecom TV

"At TelecomTV we're convinced that telcos should and will adopt an 'open' approach to service development. That's easy to write but very difficult to implement. Not least because telcos are used to thinking in terms of vertical leverage – where a power position at one level (say in the access network) is used to lever some more power (usually to squeeze out extra profitability) in another. Shaking this automatic habit of thought is difficult to say the least...but it has to be done and telcos will be bypassed if they can't make the leap.

Federating or syndicating legacy services and integrating them as components in next gen services, must be a very important part of this broader transformation. It enables telcos to maximise returns on their existing assets and, perhaps as important, it introduces commercial 'openness' as a business practice."

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Part Seven: Conclusion

So, if we are to go back to the question posed at the beginning of the paper; how to rescue the stranded operator. Is there a way to bridge the gap between the legacy TDM and future IP/IMS worlds?

The answer, this paper argues is 'yes'. And once again we're using the internet as our guide. The concept of the service mash-up, so readily adopted online, has been the catalyst for a host of business to business and consumer applications.

Of course, comparisons end here. The internet is, in the main, an open environment where developers are happy to share code and content among their peers – creating the perfect platform for collaboration and innovation. After over two decades of investment, the telecommunications landscape is vastly different, with proprietary silos at every turn, and a well established tradition of service conservatism. While a move to IP/IMS was to have changed all that, the capex squeeze has put timescales back 5-10 years.

Or has it? Viewed in a different light - one in which Service Broker is illuminated – and a very different picture emerges. It is one of a new, open and flexible service creation layer that spans the technology void between the new and old worlds, and offers the opportunity to blend existing high value components together to rapidly create compelling new services.

> *"(Service Broker) spans the technology void between the new and the old worlds, and offers the opportunity to blend existing high value components together to rapidly create compelling new services "*

This is a concept that could very well build a bridge, not to rescue the Stranded Operator, but move the game forward, to create a new market – one in which competitive advantage is gained through innovation and differentiation.

So maybe these two worlds don't look too dissimilar after all?

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Part Eight: An Ecosystem of Innovation

Best Practice from Graham Francis, Marketing Manager at OpenCloud

1. Realize the opportunity

Operators have a community of customers out there already, and if they're smart, they can hang on to them. More tailored and competitive services that add value to the consumer and highlight differentiation are needed here. Furthermore, improved levels of responsiveness – the ability to rapidly deploy these services, test and improve them, then redeploy or retire as the market demands – will generate both loyalty and revenue. There is an opportunity to do so today. There's no need to wait the five or ten years for mass-market IMS…take advantage of existing IP capabilities and blend with the current crop of successful TDM applications and start innovating today.

Of course, we live in the real world and things are rarely that simply. This brings me to my second point:

2. Create the platform and structure in network

Create a mechanism for casting a line into the vertical capabilities that exist today, and hooking those that add the most value and can be composed and recomposed into a multitude of new services – for example, charging, call control, messaging and user location. OpenCloud believes, as many now do, that this mechanism is the Service Broker. It creates a simple and effective intermediate layer between the network and service layer to overcome architectural shortcomings and enable service innovation.

These new service compositions will include both IP and TDM capabilities (at both the network and service layer) and it is the vendors who have strong experience and support for both SS7 and SIP protocols - plus real-time charging capabilities in their products - who are most likely to deliver what their customers need.

3. Maximize innovation – connect NetOps and Marketing

Service Brokers deliver innovation into the network by taking what's already there and re-constituting in a slightly different way. It's service evolution, not service revolution. And this brings into play another often un-tapped operator resource – its people.

Perhaps for the first time, network operations staff can now work with the marketing teams to devise new concepts and bring them to market in previously unachievable timescales. In the past, there would often be resistance to any new platform introduction from the operations team and a thousand reasons why it was the wrong decision. Now, with the ease of Service Broker, the network operations teams can become marketing's allies rather than their enemies.

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4. Deliver, then measure service success

Measurement, while not a direct function of Service Broker is nevertheless key to effective service delivery, and with it loyalty. The complexity and speed of bringing a service to market has, in the legacy TDM world, necessitated very serious people creating very serious return on investment models before any idea got the green light. Few ever did and this stifled innovation. Indeed, this is one of the reasons why today's operators offer the same set of services and leave it to the handset manufacturers or low cost bundles to actually sell their airtime.

Using Service Broker, product and services can be brought to market rapidly, and at relatively low cost. Crucially, if they are not immediately successful, they can be retired or swiftly customised to consumer taste. And this is where measurement comes in. While not inherent within service broker, the ability to measure the success of each new service is crucial if operators are to see real returns.

5. Be smart and innovate from within

Now that the platform is in the network and connected to both the network and service layer resources, the creation of new "smart" person to person services can begin. The telecom network and its set of previously disparate capabilities are now as integrated as the web. Exactly the same principles that have made innovation on the web possible now apply inside the telecom network.

This provides very significant opportunities to keep the value in-house. By making multiple resources available in an open, common, accessible way to a team of 'developers' (who, in this case are your own telecoms engineers) CSPs are able to innovate from within, using their rich source of capabilities – from their network to their people.

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OpenCloud's Rhino is a real-time application server for agile development, deployment and efficient management of person-to-person communication services across current and next generation technology. Rhino is a high performance, genuinely carrier-grade service execution environment for realizing a Next Generation Service Delivery Platform (NG-SDP). It uses commercial-off-theshelf (COTS) hardware and software to deliver service layer agility to TDM and IP-based networks at a radically lower price-point than traditional solutions from network equipment providers.

OpenCloud headquarters are in Cambridge, United Kingdom. R&D, Engineering and Support are located in New Zealand, Spain and there are OpenCloud branch offices in the United States, Singapore and Japan.

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