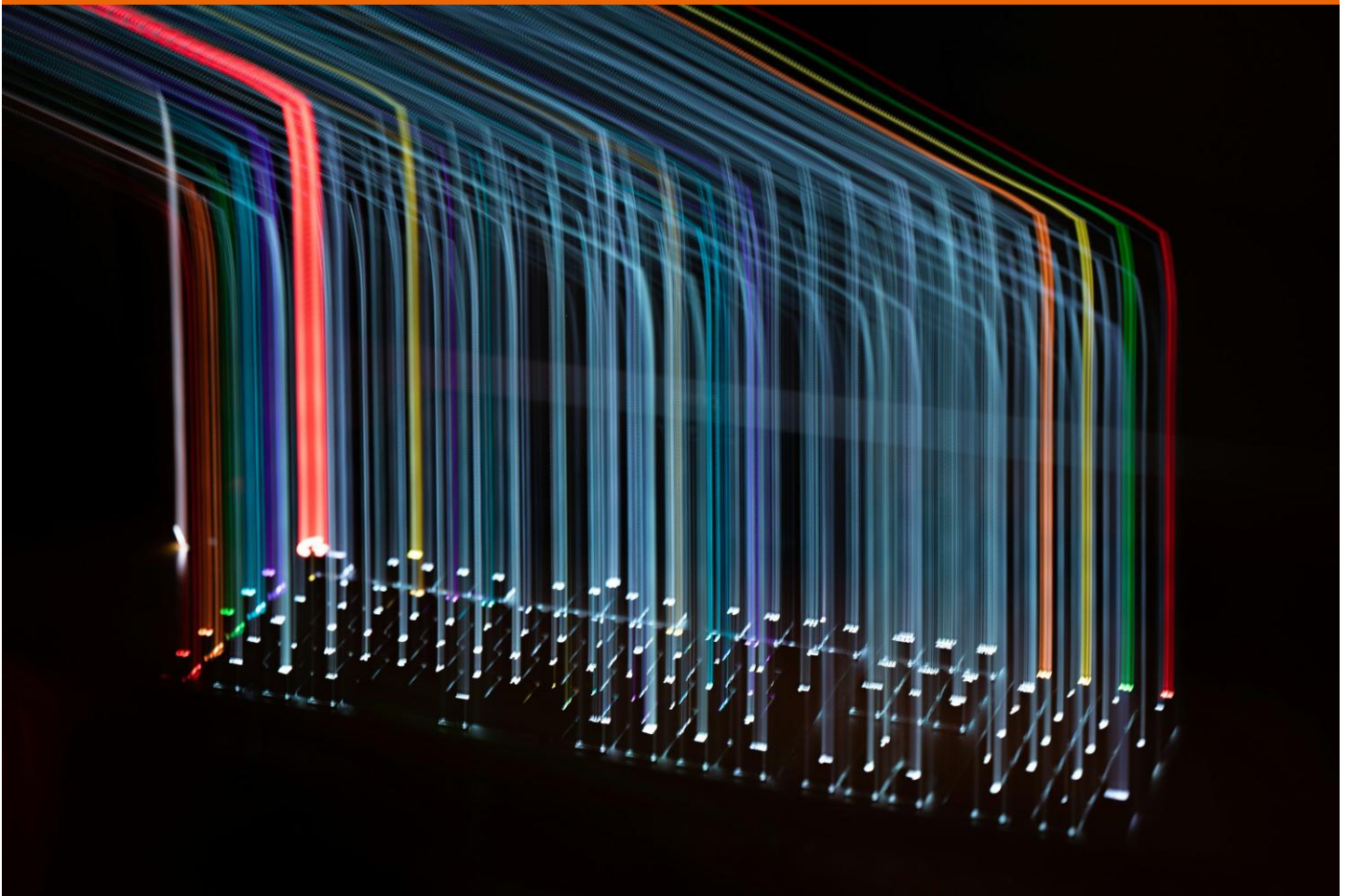


Powering Telco AI with Usage Data

Next-gen mediation will accelerate AI adoption and enable dynamic monetization

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EXECUTIVE SUMMARY

The emerging wave of artificial intelligence stands poised to fundamentally transform the telecommunications industry, with initial experimental deployments demonstrating substantial promise. Most notable is the unprecedented velocity at which this broadly adopted technology is advancing in maturity and expanding its functional capabilities within the telecommunications sector. The initial phase of adoption generated considerable interest and produced numerous ambitious use case demonstrations, and this momentum has intensified markedly with the advent of Agentic AI over the past eighteen months.

However, despite AI's rapid technological progression, the practical reality of bridging the adoption gap in AI-readiness is becoming increasingly apparent. Communications Service Providers (CSPs) cannot expect favorable outcomes without first addressing fundamental challenges related to architectural design and operational frameworks. CSPs must prioritize the development of adaptable infrastructure and systems capable of accommodating the continuous evolution of AI technologies without necessitating wholesale architectural redesigns.

This strategic imperative rests on three foundational pillars:

First, data quality must be the primary focus, as AI system effectiveness is fundamentally dependent upon it. This consideration is particularly critical for CSPs operating legacy infrastructure with fragmented data silos, where data extraction and harmonization can prove highly complex and resource-intensive.

Second, CSPs must ensure comprehensive understanding of operational context, which varies substantially across industries and is uniquely distinctive within telecommunications due to proprietary standards, protocols, and frameworks. This requirement demands AI platforms that possess inherent understanding of telecommunications-specific contexts and are purpose-built to align with telco process frameworks, supplemented by robust capabilities for testing industry-specific scenarios and use cases.

Third, CSPs need to prioritize alignment with established industry standards to avoid redundant development efforts and ensure solution portability across varying operational and regulatory requirements. Adherence to standards-based approaches enables interoperability, reduces vendor lock-in, and facilitates more efficient scaling of AI capabilities across the organization.

This imperative calls for a fundamental reimagining of traditional telecom systems and operational processes, particularly those that directly impact data management and revenue realization capabilities. Modern mediation systems are well positioned to serve as catalysts for this shift, by moving data management from batch-oriented, siloed processes to real-time, unified data platforms that can feed both operational systems and AI engines simultaneously. This report examines how mediation systems—historically viewed primarily as transactional processing engines—can be repositioned as strategic enablers that accelerate and facilitate AI readiness and future revenue readiness across the telco enterprise.

BOTTLENECKS IN LEGACY TELCO SYSTEMS

Three key bottlenecks are driving evolution of telco mediation systems -

1. **5G Readiness** - Despite years of preparation and investment, true 5G readiness remains elusive for many operators. Many implementations have taken a hybrid approach, bolting 5G capabilities onto legacy platforms rather than fully embracing service-based architecture principles. Such half-measure creates ongoing challenges. Legacy mediation engines, built for 3G and 4G architectures with rigid, batch-oriented designs struggle with the real-time, multi-dimensional charging requirements that 5G services demand. Additionally legacy mediation systems create friction in 5G environments by requiring manual configuration for each new service type or network slice, turning what should be dynamic service provisioning into lengthy deployment cycles.
2. **Agility** - On-prem based mediation systems have become notorious constraints on commercial agility as configurability remains surprisingly limited in many platforms. Leveraging insights from data, launching new service bundles, implementing dynamic pricing models, or responding to competitive pressures often requires lengthy development cycles and vendor dependencies. This rigidity has spawned an ecosystem of workarounds. Business units increasingly rely on shadow IT solutions—spreadsheets, middleware layers, and manual processes—to bridge gaps in charging system functionality. These patches create operational risk, increase costs, and perpetuate technical debt.
3. **Scale** - Legacy platforms were designed for traditional voice and data services with predictable transaction volumes and tolerable latency thresholds. The explosion of IoT/ M2M communications has fundamentally challenged these assumptions. IoT use cases generate massive transaction volumes—often orders of magnitude higher than conventional services—while operating on razor-thin margins that leave no room for processing inefficiencies. Telcos locked into non-scalable mediation platforms are unable to participate in emerging revenue streams such as edge computing, AI-driven services etc. Low-latency requirements further compounds the problem as existing systems struggle to process events within acceptable timeframes at scale.

THE EVOLUTION OF TELCO MEDIATION SYSTEMS

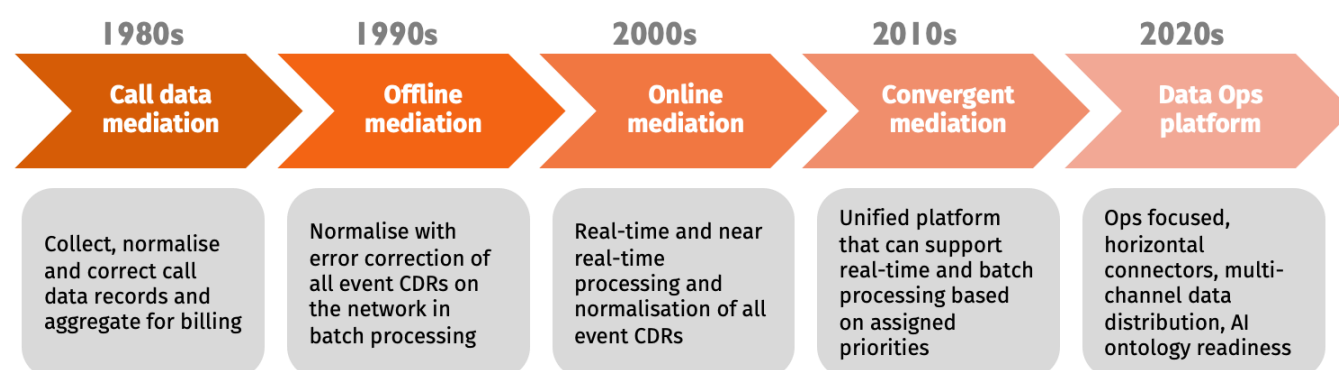
Mediation systems first emerged in the 1980s to address a fundamental architectural challenge: protecting mission-critical billing platforms from being overwhelmed by the growing volume and complexity of network event data. By serving as an intermediary layer, mediation systems took on the critical tasks of aggregating disparate event records, normalizing them into consistent formats, and filtering out non-chargeable traffic before passing cleaned data downstream to billing engines. This preprocessing function proved essential for maintaining billing system stability and performance.

The scope and sophistication of mediation evolved in lockstep with the telecoms industry itself. The advent of mobile networks in the 1990s represented a pivotal inflection point, introducing

unprecedented traffic volumes and transaction scale that would have been unmanageable without robust mediation infrastructure. By the 2000s, a new paradigm emerged with real-time mediation capabilities, initially deployed to support prepaid charging use cases where immediate balance deduction was essential. This real-time functionality subsequently expanded to postpaid services as operators sought tighter revenue assurance and enhanced customer experience through instant usage visibility.

The most recent—and perhaps most consequential—evolution has repositioned mediation as a broader data operations platform. Interestingly, this transformation actually predated the current AI boom, with forward-thinking vendors beginning to expand mediation's role beyond revenue management to encompass network analytics, service assurance, and cross-domain data integration. However, this expanded mandate gained serious attention only in recent years as CSPs confronted the data consolidation requirements of AI initiatives, suddenly recognizing that their mediation infrastructure had quietly evolved into a strategic data asset.

Figure 1: Overview of how telco mediation systems have evolved

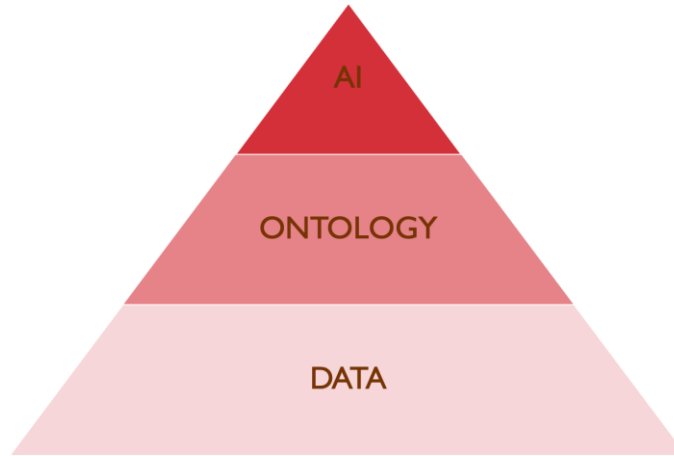


Source: Appledore Research

THE AI TECHNOLOGY STACK

CSPs are increasingly focused on the foundational infrastructure required to deliver on AI's promised capabilities. This maturation reflects a growing industry recognition that successful AI deployment depends less on algorithmic innovation and more on robust underlying architectures. The AI technology stack can be conceptualized as a three-tier pyramid (Figure 3), with each layer supporting those above it. At the base sits the data layer—the foundation comprising all raw inputs, historical records, and real-time feeds that fuel AI systems. The middle tier contains the ontology and semantic models that provide structure, context, and relationships to raw data, enabling AI engines to understand domain-specific concepts and business logic. Finally, the apex represents AI applications themselves—the customer-facing tools, automation engines, and decision-support systems where tangible business value is ultimately realized.

Figure 2: Simplified overview of AI application stack



Source: Appledore Research

However, CSPs encounter significant obstacles at the very foundation of this pyramid. Data silos create immediate stumbling blocks that prevent effective progression up the stack. Without resolving foundational data challenges, investments in upper-layer AI capabilities risk delivering suboptimal results—or failing entirely.

The implications are profound: data disaggregation has emerged as a strategic bottleneck that many CSPs now prioritize above other AI infrastructure investments. CSPs recognize that no amount of model refinement can compensate for fragmented foundational data. Consequently, CSPs are actively evaluating multiple approaches to data consolidation, with many operators likely to pursue parallel strategies simultaneously given the urgency attached to resolving this challenge.

This convergence of challenges and capabilities explains why next-gen cloud-based mediation systems—with their proven track record of aggregating multi-source network data—are being reconsidered as potential foundations for broader data unification efforts. Unlike previous reinvention attempts—such as the big data analytics (BDA) initiatives of the past decade that failed to materially expand mediation's role—the current AI-driven demand reflects fundamentally different requirements and constraints.

CSPs now seek an independent, telco-native data source capable of rapidly and cost-effectively feeding AI engines with consistent, contextualized information. Crucially, operators want solutions that understand telecommunications domain logic rather than generic data platforms that require extensive customization. Mediation systems possess inherent advantages for this role. They already function as proven aggregators and normalizers of multiple heterogeneous data feeds, handling real-time processing at scale with established reliability. Extending these capabilities to incorporate additional data sources—such as CRM systems, service assurance platforms, and customer interaction records—represents a pragmatic evolution rather than a revolutionary rebuild. For many CSPs, this incremental enhancement approach offers a significantly faster time-to-value and lower total cost of ownership compared to constructing purpose-built AI data infrastructure from scratch.

MODERN MEDIATION SYSTEMS CAN ACCELERATE AI-READINESS AND FUTURE REVENUE-READINESS

As telcos navigate the dual imperatives of AI transformation and revenue innovation, mediation systems are emerging as a critical enabler on both fronts. On the AI readiness dimension, modern mediation platforms can serve as the foundational layer for accurate, context-aware AI operations. By delivering real-time usage data with granular detail, these systems can provide AI engines with the precise contextual inputs needed to reduce hallucinations and enhance decision accuracy.

Beyond AI enablement, next-generation mediation systems are well placed to accelerate a fundamental shift in telco monetization frameworks. Traditional charging models built on simple volume or count-based parameters are increasingly inadequate in hyper-personalized, context-sensitive pricing frameworks. Modern mediation platforms are set to enable telcos to evolve toward dynamic multi-dimensional multi-state pricing models.

This evolution—from static, one-dimensional charging to dynamic, multi-parameter monetization—represents the future of telco commercial models. And at the heart of this transformation sits mediation: both as the intelligence layer feeding AI-driven operations and as the enabler of the sophisticated, real-time charging frameworks that will define next-generation revenue models

Accelerating AI-readiness

The **advent of AI** has unexpectedly thrust mediation systems back into the strategic spotlight. The primary obstacle CSPs now face in scaling AI adoption is the fragmentation of data across disparate silos. Multi-vendor environments have created isolated data repositories that prove far more challenging to reconcile than many operators initially anticipated. Without providing AI engines with a comprehensive, 360-degree view spanning customer behavior, network performance, and operational metrics, CSPs cannot achieve the data completeness necessary for reliable AI outputs. The evolution from legacy mediation to data ops platform represents a fundamental shift from a single-purpose revenue assurance tool to a strategic data infrastructure layer. The modern platform maintains backward compatibility with traditional mediation functions while extending capabilities to address enterprise-wide data challenges—particularly the data consolidation requirements that have become critical for AI adoption and digital transformation initiatives in telecommunications. Table below captures the key differences between legacy on-prem mediation systems and modern cloud-based data-ops platform

Function	Legacy, on-prem mediation	Cloud-based data-ops platform
Data sources	Network elements, switches, and usage-generating systems only	Multi-domain sources including network, BSS, OSS, CRM, IoT, and external data feeds
Data processing	Batch-oriented with scheduled collection cycles (typically hourly/daily)	Real-time streaming with event-driven processing and on-demand batch capabilities

Function	Legacy, on-prem mediation	Cloud-based data-ops platform
Output	Primarily billing systems, with limited feeds to fraud management	Multiple downstream consumers: billing, AI/ML engines, analytics platforms, customer experience systems, network optimization tools
Data Enrichment	Basic normalization and tariff/rating table lookups	Advanced enrichment with customer context, network topology, service metadata, geolocation, and cross-domain correlation
Scalability & Performance	Vertical scaling designed for predictable telecom traffic growth	Horizontal scalability with elastic infrastructure supporting variable AI workloads and analytics bursts
Use cases	Revenue management, interconnect billing, fraud detection (limited)	AI/ML model training and inference, customer 360° views, network automation, predictive maintenance, service assurance, business intelligence, regulatory reporting

Accelerating future revenue-readiness

AI is set to drive greater demand for intent-based monetization models, which represents a potentially paradigm-shifting development for telco charging engines. This model fundamentally reorients the monetization philosophy away from traditional resource consumption metrics—data volumes, call minutes, message counts—toward the actual outcomes and experiences customers seek to achieve.

Operationalizing intent-based monetization demands a fundamental shift in platform capabilities—from simple usage metering to sophisticated experience and outcome monitoring. The charging system must ingest and interpret quality-of-experience metrics, map them to specific customer intents, and determine appropriate charges based on actual delivery performance. This requirement creates intricate dependencies between the monetization platform and adjacent systems and data sources—real-time network telemetry, quality assurance monitoring etc. Modern mediation systems can unlock dynamic monetization by providing the real-time data foundation required for context-aware, multi-dimensional charging models that respond to network conditions, user behavior, and service quality simultaneously. Unlike legacy systems limited to static rate plans based on volume or duration, next-generation data ops platforms can ingest and correlate diverse data points enabling telcos to implement sophisticated pricing strategies such as congestion-based pricing, quality-tiered charging, or value-based models that align cost with customer-perceived value.

Additionally, **dynamic pricing** models require capabilities to apply charges based on non-parametrised conditions such as experiential quality delivered or whether an AI recommendation proved useful etc. These scenarios require the charging system to assess value delivery contextually, making monetization decisions based on the actual nature and quality of the service experience rather than relying on predetermined conditions alone.

CONCLUSION AND RECOMMENDATIONS

As CSPs accelerate AI experimentation and adoption, attention is shifting to the foundations of AI—robust data infrastructure and comprehensive ontologies. In this context, the mediation system is uniquely positioned to provide a fast-track route to AI-readiness. For mediation, the evolution toward data operations platforms represents a fundamental shift from their traditional role as single-purpose revenue assurance tools to functioning as strategic data infrastructure layers. This transformation repositions mediation from a backend utility focused primarily on data collection and normalization into a central enabler of enterprise-wide data intelligence, quality management, operational insight and revenue accelerator.

Appledore Research recommends the following:

1. **CSPs should prioritize the foundational requirement of delivering high-quality data for AI operations.** Mediation platforms ensure comprehensive data collection, normalization, and enrichment across all network and service touchpoints, while also providing context to monetization systems to ensure effective tracking of service consumption and pricing contexts. A modern mediation platform can play a key role in generating contextually rich, reliable datasets that AI models require for effective training, inference, and decision-making.
2. **CSPs should prioritize the evolution of mediation systems into cloud-based data operations platforms.** This transformation enables mediation to serve as a foundational data infrastructure layer that supports AI readiness, real-time analytics, and dynamic monetization capabilities. Cloud-native architectures provide the scalability, flexibility, and integration capabilities necessary to handle increasing data volumes, support diverse AI workloads, and adapt rapidly to evolving business requirements. Additionally, cloud-based deployment can be significantly cost efficient compared to virtual machine or on-prem deployments.
3. **CSPs should prioritize architectural agility over feature functions:** Given the accelerating pace of evolution in AI and associated telco applications, CSPs should avoid specifying mediation engines based exclusively on present-day requirements. Rather, the focus should be directed toward platforms that demonstrate inherent adaptability—systems architected to evolve seamlessly and be reconfigured to accommodate emerging use cases such as those that demand ultra-low latency processing and support for non-parameterized business models.

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