



Houston, we have a problem.

By Michael Iantosca, Avalara Inc.

It's 10 PM, do you know where your documents are?

Some of you might remember that take-off "*It's 10 PM, do you know where your children are?*" It was a public service announcement that aired ad nauseam on television in the 70s and 80s across the United States. There's not a more applicable notion about the current state of enterprise content in many organizations.

While generative AI is all the rage, enterprise content operations remain the elephant in the room that few want to talk about. If we were to ask most reading this - *do you have control of all your user-facing content from across the enterprise?* You'll often receive a perplexed look. If you answered yes, you're the proverbial unicorn. You might not care, but your customers do, and the business should.

The virtual absence of integrated and automated operations orchestration costs customers and companies a fortune in hidden costs. And it is not simply a content inventory gap, it's the lack of an integrated *enterprise-wide* content strategy and unified *enterprise-wide* content operations.

While siloed content strategies and operations might exist for individual departments, how can a company profess to have a customer content strategy at all? And how can a company achieve the goal of delivering the right content, to the right person, at the right time, and in the right experience? Few do.

But what is a content strategy? Ask different folks and you'll get different answers. The term is so overloaded that it should be stricken from our vernacular. A content strategy is an orchestrated aggregation of multiple strategies. Here's a subset:

- Content model strategy
- Content conversion and migration strategy
- Content design strategy
- Content creation strategy

- Content reuse strategy
- Content publishing strategy
- Content quality governance strategy
- Content localization strategy
- Content compliance strategy
- Content knowledge (semantic) strategy
- Content AI strategy

The list goes on. What tools do you use to integrate and manage all these strategies as an orchestrated whole? Few, if any, have anything more sophisticated than spreadsheets, collaborative whiteboards, transient ticketing systems, wikis, cloud docs, or something worse – like Jira. That’s because most haven’t prioritized unifying and automating content operations. They’ve been preoccupied with establishing and improving content creation and delivery systems along with the daunting task of busting content silos. Busting the distributed and fragmented *content operations* silos that exist across the enterprise lags but remains equally important.

Over the last quarter-century, the content industry has witnessed a remarkable evolution. Today, we are spoiled for choice with an abundance of advanced, ready-to-use technologies and systems for content creation and distribution, eliminating the need to construct these intricate systems from the ground up as was once necessary. However, when it comes to integrating, automating, and streamlining operations, we find ourselves in a paradoxical situation, akin to the shoemaker's children going barefoot; unification and automation of operations still largely require a bespoke approach.

Confronting these harsh realities is essential for advancing our capabilities. While we've made notable strides in dismantling content silos through innovations like headless content management systems, content lakes, and meshes, we've overlooked the fragmentation of content operations across various functional departments within organizations. Rarely do departments such as product development, learning, support, developer relations, partnership, marketing, sales, and others that all generate customer-facing content work together to create a cohesive content experience. This unified approach to content, which we refer to as the *Total Content Experience*, remains an underexplored opportunity for improvement.

But what do we mean by content operations? It's yet another overloaded term like content strategy. In the new publication, *Content Operations from Start to Scale Perspectives from Industry Experts* (Evia, C. (ed.) 2024. Blacksburg: Virginia Tech Publishing), content operations is broadly defined as “*The implementation of a strategy that incorporates people, processes, and technologies to optimize content production, so that organizations can leverage their content as business assets while retaining content quality.*”

The practice of content operations encompasses the *totality* of orchestrating the people, processes, execution, and governance of content and management throughout the entire lifespan of content, which is often years. Content operations include:

- Content planning
- Content design
- Assignment management
- Inventory management

- Communications and notifications
- Translation planning and fulfillment
- Quality and standards governance
- Content creation and delivery
- Content analytics
- ...and more

Many view content operations too narrowly, focusing solely on the processes of content production and delivery, yet its true scope is far more expansive. The challenge lies in effectively managing this breadth. What we need is akin to a Mission Control system for content operations—a central hub that orchestrates and oversees the entirety of our content endeavors and one that ushers in an epochal shift that transforms content operations that extend into new realms such as content management for generative AI.

Let's call it *Content Central*.

Content Central revolutionizes the way enterprises manage their content operations by creating a fully integrated, end-to-end digital ecosystem. At its heart lies a robust system of record (SoR) that ensures continuity and reliability, enhanced by automated workflows, digital dashboards, and messaging systems that streamline operations management and governance.

The platform is built on a flexible, API-driven architecture, making it accessible as a web portal to authorized users. This extensibility allows organizations to seamlessly connect a variety of content management systems, tools, and services, whether they are provided by third-party vendors or developed in-house.

Content Central is more than just a single application; it's a comprehensive and extensible framework that hosts and integrates multiple applications and shared services. These components cover a wide range of functions as illustrated in Figure 1.

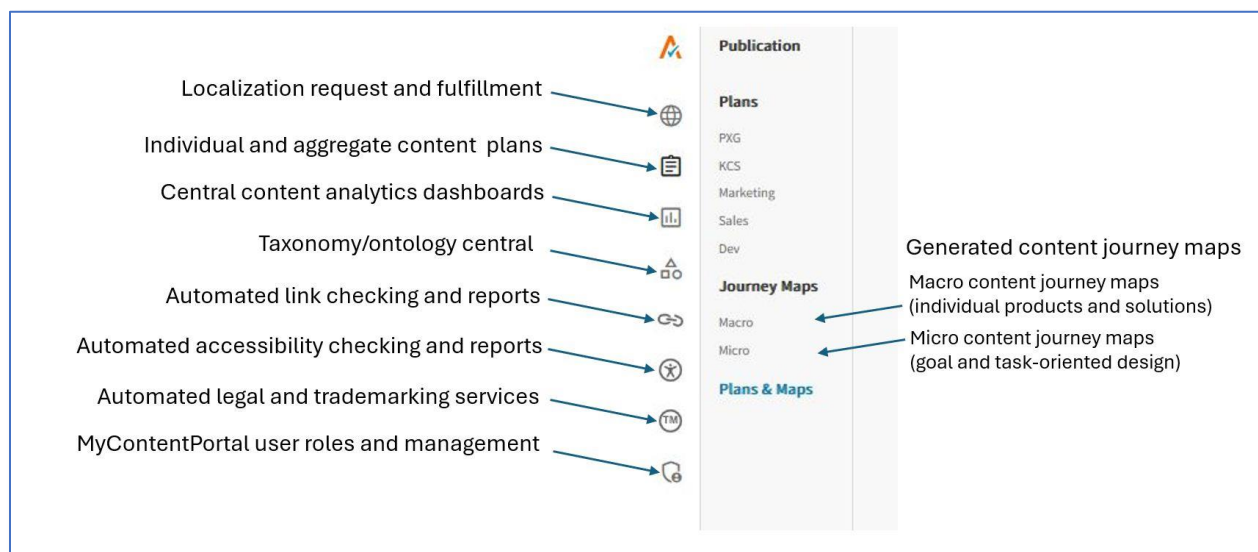


Figure 1. MyContentPortal operations management services

Within Content Central, operations management applications and services are not siloed. Instead, they are fully integrated and orchestrated through workflow automation, tracking, data exchange, role management, and notifications. This integration ensures a cohesive operation while maintaining the flexibility to meet the diverse needs of various content teams across the organization.

Name	Jira Ticket	Publication Manager	Case Owner Name	Assigned Writer	Status	Published Date (Dev)	Published
<input checked="" type="checkbox"/> 24511500 - Support article for ECS	Create Ticket	Michael Iantosa	Zak Hartkin		NEW		
<input type="checkbox"/> 24511500 - Support article for ECS	KCS-90	Michael Iantosa	Zak Hartkin	Anurag Sharma	PUBLICATION SUCCESSFUL (PROD)	Feb 15, 2024, 09:36:10 AM	Feb 15, 2024
<input type="checkbox"/> 24511500 - Support article for ECS	KCS-89	Michael Iantosa	Zak Hartkin	Anurag Sharma	PUBLICATION SUCCESSFUL (PROD)	Feb 15, 2024, 08:47:12 AM	Feb 15, 2024
<input type="checkbox"/> 24511501 - New article for demonstration	KCS-88	Michael Iantosa	Zak Hartkin	Anurag Sharma	PUBLICATION SUCCESSFUL (PROD)	Feb 14, 2024, 05:50:18 PM	Feb 15, 2024
<input type="checkbox"/> 24511500 - Support article for ECS	KCS-79	Michael Iantosa	Zak Hartkin	Anurag Sharma	WRITING / REVIEWING IN PROGRESS		
<input type="checkbox"/> 24511500 - Support article for ECS	KCS-73	Michael Iantosa	Zak Hartkin	Anurag Sharma	PUBLICATION SUCCESSFUL (PROD)	Feb 15, 2024, 12:41:26 PM	Feb 15, 2024
<input type="checkbox"/> 24511500 - Support article for ECS	KCS-74	Michael Iantosa	Zak Hartkin	Anurag Sharma	PUBLICATION SUCCESSFUL (PROD)	Feb 15, 2024, 06:36:20 AM	Feb 15, 2024
<input type="checkbox"/> 24511500 - Support article for ECS	KCS-77	Michael Iantosa	Zak Hartkin	Anurag Sharma	APPROVAL IN PROGRESS	Feb 15, 2024, 12:09:09 PM	
<input type="checkbox"/> 24511500 - Support article for ECS	Create Ticket	Michael Iantosa	Zak Hartkin		NEW		
<input type="checkbox"/> 24511500 - Support article for ECS	Create Ticket	Michael Iantosa	Zak Hartkin		NEW		
<input type="checkbox"/> 24511500 - Support article for ECS	Create Ticket	Michael Iantosa	Zak Hartkin		NEW		
<input type="checkbox"/> 24511500 - Support article for ECS	Create Ticket	Michael Iantosa	Zak Hartkin		NEW		
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<input type="checkbox"/> 24511500 - Support article for ECS	Create Ticket	Michael Iantosa	Zak Hartkin		NEW		
<input type="checkbox"/> 24511500 - Support article for ECS	KCS-72	Michael Iantosa	Zak Hartkin	Anurag Sharma	WRITING / REVIEWING IN PROGRESS		
<input type="checkbox"/> 24511500 - Support article for ECS	KCS-71	Michael Iantosa	Zak Hartkin	Anurag Sharma	WRITING / REVIEWING IN PROGRESS		

Figure 2. Avalara's MyContentPortal – an enterprise content operations management center

Digital enterprise content planning and assignment workflow management subsystem

At the core of a robust content mission control system are the essential processes of digital content planning and tracking, underpinned by persistent digital records that span the entire content lifecycle, from creation through retirement. This system supports multiple, distinct content plans for different organizational teams including product, learning, support, and marketing, through a persistent system of record (SoR). Unlike transient systems like Jira, this SoR ensures content plans and records remain active and accessible, providing a stable framework for content management over many months or years.

Content plans detail publication records for each piece of content, with each team having its own set of records for their specific content needs. For example, a content planner for product documentation and planners in other departments develop separate publication plans for the same product, overseen by an Enterprise Information Architect or Enterprise Content Strategist who coordinates with product owners and designs the overarching strategy.

Each publication record includes detailed metadata to aid in planning, management, assignment, and workflow automation. Content Central generates a management dashboard for each content plan, showing publication details, status, and actions through an interactive interface. Additionally, Content Central uses those plans to automatically generate an *Integrated Content Plan* (ICP) that provides a comprehensive view of the content strategy and combined content plans for any given product offering.

Content Central keeps the status and details of publication records and dashboards dynamically updated, sending notifications for actions like unpublishing or re-reviewing, ensuring stakeholders are informed and compliant throughout the content's lifecycle.

Name	Support article for ECS Essentials	Case Owner Name	Zak Haitkin
Approvers	ashwinkumar.sharma+approver@avalara.com	Case Owner Email	ashwinkumar.sharma+owner@avalara.com
Existing KC Article	-	Approval Message	Looks good now.
Issue Category	content	Published Date (Dev)	Feb 22, 2024, 11:58:12 AM
Article Type	internal	Published URL (Dev)	https://avalara-dev.zoominsoftware.io/bundle/jhz1706542288662/page/a_test_func_description.html
Functional Description	A test func description	Published Date (Prod)	Feb 22, 2024, 12:00:16 PM
List of SMEs	ashwinkumar.sharma+sme1@avalara.com,ashwinkumar.sharma+sme2@avalara.com	Published URL (Prod)	https://knowledge.avalara.com/bundle/jhz1706542288662/page/a_test_func_description.html
Assigned Writer	Anurag Sharma		

Jira details

Jira ticket Details

[KCS-97](#)

Figure 3. A portion of an Individual publication record

Content journey map (design) subsystem

Many content teams that do content journey mapping create them as one-off, often static artifacts using collaborative digital whiteboarding systems such as Miro, Mural, or similar. This model provides two types of content journey maps, macro journey maps, and micro journey maps that require significantly less time and effort to create and maintain.

Macro journey content maps

Macro content journey maps expand traditional user journey mapping by charting content interactions across key user engagement stages like Discovery, Learning, Use, and Advocacy. These maps, adaptable to any organization's structure, offer a broad view of content's lifecycle and its impact on the user experience, from initial discovery through to advocacy. They help identify strategic content opportunities, detect redundancies, assess content performance, and guide updates or retirement decisions.

Content Central supports these insights with a sophisticated system that links content pieces to their lifecycle stages, equipped with metadata for automatic map generation. This creates a dynamic, evolving view of an organization's content strategy, with the flexibility to adjust to changing engagement patterns. Interactive features allow users to access analytics directly, offering real-time performance data to inform strategic adjustments, and ensuring the content strategy remains aligned with user needs and organizational goals.

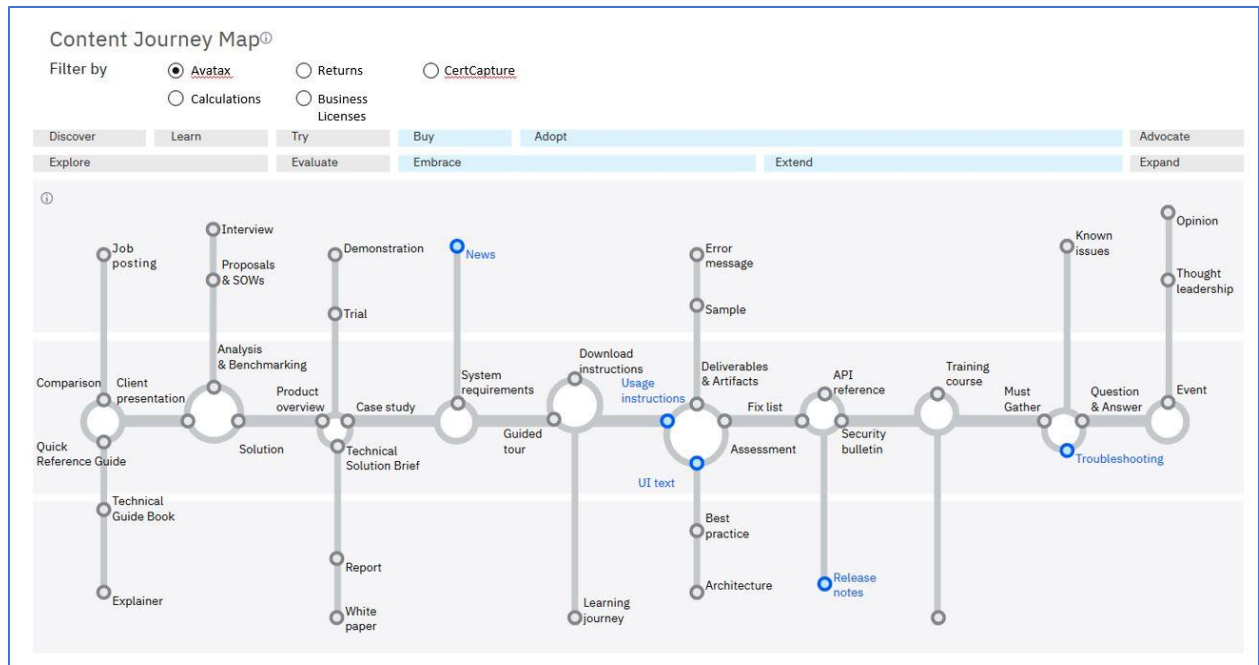


Figure 4. Sample generated macro journey map from publication records

Micro journey content maps – content design

Micro journey maps serve as focused, goal-oriented frameworks for content design, tailored to facilitate specific product usage objectives. These maps may feature multiple entry points, each representing a distinct goal that users aim to achieve. Every goal is broken down into tasks, which in turn may be divided into subtasks, creating a structured path that guides users toward accomplishing the overarching goal. These micro journeys can either stand alone, focusing on individual goals or be linked together to form a comprehensive sequence, such as a detailed multi-step onboarding process.

Within Content Central, information architects and content professionals create Content Journey Records for each identified goal. They then associate these records with relevant content artifacts aligned with the tasks and subtasks necessary for goal completion. When integrated with a content management system, Content Central enables users to effortlessly link existing content from their content libraries to specific tasks or identify gaps where new content needs to be developed.

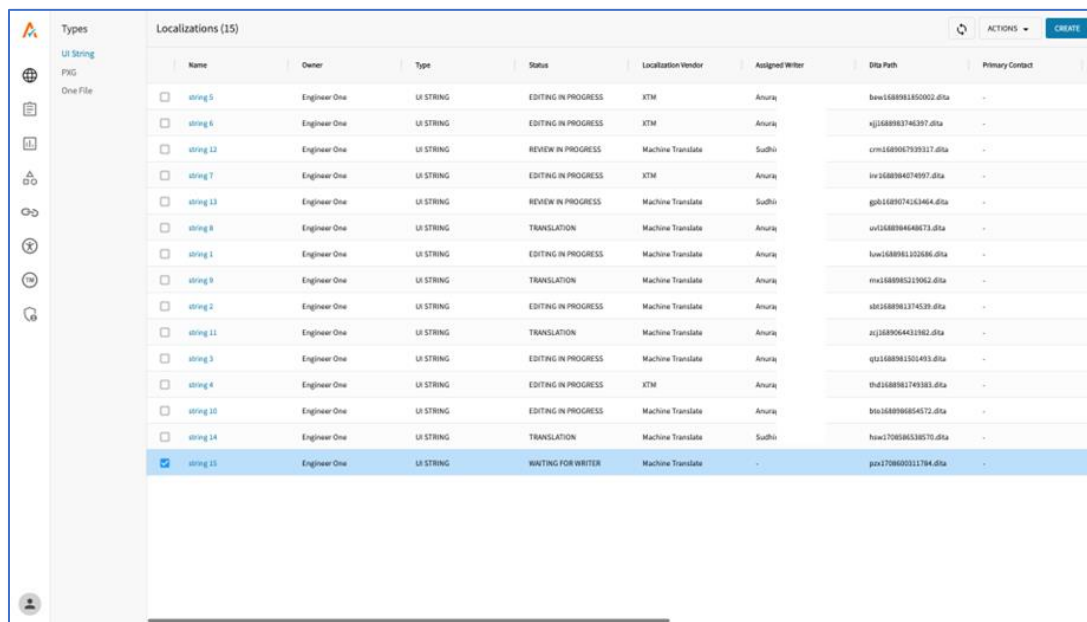
Leveraging these detailed Content Journey Records, Content Central dynamically generates interactive micro journey maps. These maps visually or tabularly represent the relationship between content artifacts and their respective publication records, offering an intuitive navigation experience. Designed to be adaptive, these micro journey maps are living documents that continuously evolve and are more easily maintained, reflecting updates and changes in real-time based on their underlying persistent records. This approach ensures that content strategies remain agile and responsive to the changing needs and behaviors of users, fostering a more engaging and effective product experience.

Localization request and fulfillment subsystem

Content Central encompasses a comprehensive localization request and fulfillment subsystem, streamlining the entire process of localization from initiation to completion. This subsystem seamlessly integrates with both internal content management systems and external translational planning systems (TMS) through API connections. This integration facilitates the automated, bidirectional exchange of content with translation service providers (TSPs), supporting both machine and human-assisted localization services.

A key advantage of this integrated approach is the automation of localization workflows within the unified content operations platform of Content Central. When a publication record is marked for localization, the system automatically initiates a localization request. This request is pre-populated with essential metadata from the publication record, simplifying the process of localization fulfillment and subsequent publishing. This streamlined workflow not only enhances efficiency but also ensures consistency across localized content.

Moreover, this model supports the localization of application strings, effectively incorporating content professionals into the review and editorial processes for user interface content. By doing so, Content Central ensures that localization is not just about translating text but also about adapting the user experience to meet the linguistic and cultural expectations of diverse user bases. This integrated approach to localization underscores Content Central's commitment to delivering content that is not only accurate but also contextually relevant across global markets.



Name	Owner	Type	Status	Localization Vendor	Assigned Writer	Dita Path	Primary Contact
<input type="checkbox"/> string 5	Engineer One	UI STRING	EDITING IN PROGRESS	XTM	Anuraq	bmc1688991850902.dita	-
<input type="checkbox"/> string 6	Engineer One	UI STRING	EDITING IN PROGRESS	XTM	Anuraq	qj1688983746397.dita	-
<input type="checkbox"/> string 12	Engineer One	UI STRING	REVIEW IN PROGRESS	Machine Translate	Sudhi	cm1688967939317.dita	-
<input type="checkbox"/> string 7	Engineer One	UI STRING	EDITING IN PROGRESS	XTM	Anuraq	iv16889840274997.dita	-
<input type="checkbox"/> string 13	Engineer One	UI STRING	REVIEW IN PROGRESS	Machine Translate	Sudhi	gpb1688974363464.dita	-
<input type="checkbox"/> string 8	Engineer One	UI STRING	TRANSLATION	Machine Translate	Anuraq	uv1688984648673.dita	-
<input type="checkbox"/> string 1	Engineer One	UI STRING	EDITING IN PROGRESS	Machine Translate	Anuraq	lmc1688961352086.dita	-
<input type="checkbox"/> string 9	Engineer One	UI STRING	TRANSLATION	Machine Translate	Anuraq	rm1688985219062.dita	-
<input type="checkbox"/> string 2	Engineer One	UI STRING	EDITING IN PROGRESS	Machine Translate	Anuraq	ab1688981374539.dita	-
<input type="checkbox"/> string 11	Engineer One	UI STRING	TRANSLATION	Machine Translate	Anuraq	aj1689064431982.dita	-
<input type="checkbox"/> string 3	Engineer One	UI STRING	EDITING IN PROGRESS	Machine Translate	Anuraq	qt1688981301453.dita	-
<input type="checkbox"/> string 4	Engineer One	UI STRING	EDITING IN PROGRESS	XTM	Anuraq	th1688981749383.dita	-
<input type="checkbox"/> string 10	Engineer One	UI STRING	EDITING IN PROGRESS	Machine Translate	Anuraq	bta1688986854572.dita	-
<input type="checkbox"/> string 14	Engineer One	UI STRING	TRANSLATION	Machine Translate	Sudhi	hmc1708584538570.dita	-
<input checked="" type="checkbox"/> string 15	Engineer One	UI STRING	WAITING FOR WRITER	Machine Translate	-	pm1708690211784.dita	-

Figure 5. Automated localization request and fulfillment subsystem

Content analytics and KPI subsystem

Content Central houses sophisticated analytics and KPI subsystems, complete with comprehensive dashboards designed to harness and interpret data from a multitude of sources. This subsystem is pivotal for generating actionable insights, requiring the integration of metrics from diverse platforms such as content management systems (CMS), learning management systems (LMS), customer data

platforms (CDPs), content quality and governance tools, support platforms, and SEO systems, among others. Each of these sources contributes unique metrics related to content creation, usage, quality, compliance, self-service efficiency, and web performance.

At the core of Content Central's approach is an API-driven analytics aggregation system that expertly combines these varied metrics. This process can be likened to crafting a complex recipe, where the metrics serve as ingredients, and the resulting dish consists of tailored key performance indicators (KPIs) and dashboards. These dashboards are meticulously designed to meet the needs of different stakeholders within the organization, including content creators, managers, information architects, strategists, and executives. By weaving together these disparate data sources and applying business intelligence (BI), Content Central creates detailed analytics dashboards with deep drill-down capabilities. These dashboards offer stakeholders precise, actionable insights for content improvement and strategic tracking.

Moreover, the integration of metrics extends across Content Central's various subsystems, enriching content plan records, interactive content journey maps, and more. This creates a dynamic, integrated analytics framework that evolves, providing ongoing capture, tracking, trending, and reporting of content analytics. This system eliminates the need for labor-intensive, manual processes and disjointed, one-off solutions, offering a streamlined, holistic view of content performance across the enterprise.

Common content services

Content Central also serves as a hub for a suite of shared content services that are utilized enterprise-wide, enhancing efficiency, and ensuring consistency across various teams and content management systems. These services encompass a range of essential functions, including but not limited to:

- Automated accessibility checking and reporting to ensure content meets accessibility standards.
- Automated checks for trademark compliance to safeguard against potential legal issues.
- A centralized system for managing terminology and taxonomy, facilitating the use of consistent language use across all content.
- A streamlined request and feedback mechanism that encourages collaboration and continuous improvement.

By centralizing these services within Content Central, they become readily accessible to diverse teams working with different content management systems, fostering a unified approach to content creation and management. Moreover, the integration of compliance-related services into Content Central automates the process of ensuring content adheres to required standards. Publication records are automatically updated with the outcomes of these services, and content that fails to meet predefined criteria can be flagged, preventing its publication until it complies with the necessary standards. This not only streamlines the compliance process but also significantly reduces the risk of publishing non-conforming content.

Case study: Content central in action for an automated support article workflow

Content Central streamlines the creation and distribution of support articles through a Knowledge Managed Support (KCS) process, automating the workflow from case resolution to article publication. This process begins when a support agent, using a system like Salesforce, identifies a recurring issue and

initiates a KCS article request with a click. This action, facilitated by an API connection to Content Central, generates a publication record and triggers a notification to the content planner.

The planner evaluates the request and assigns it to the most suitable writer—be it an SME, a professional content developer, or another support agent—and a generative AI helps draft an initial version for quick peer review. The writing assignment is managed through a ticket in a system like Jira, which contains all necessary case details and an AI-generated draft for the writer, who also has access to SMEs for consultation.

As the writer progresses, updates are automatically reflected in Content Central, ensuring a seamless workflow. Once the article is finalized and approved, it's published to the support portal and any other targeted channels. Content Central's robust system manages the article's lifecycle, from publication potential retirement, and even localization if needed. It also collects and analyzes usage data to continuously improve content effectiveness and strategy.

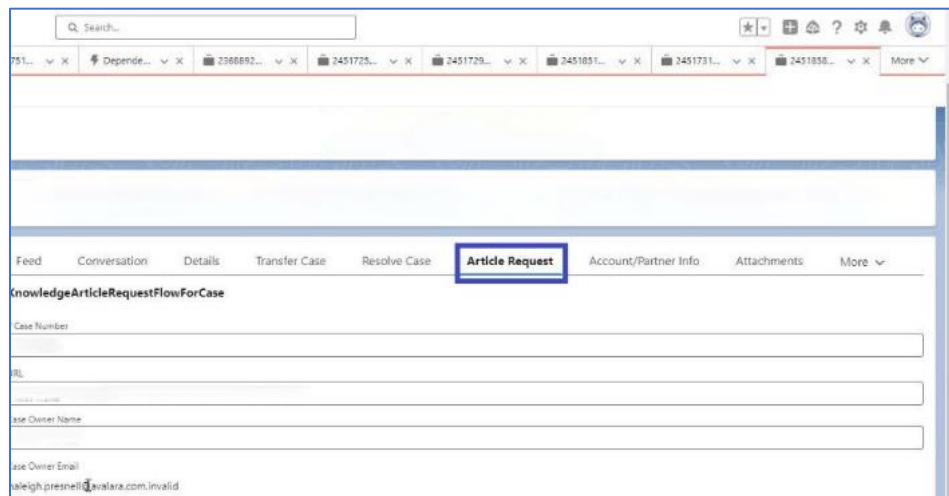
The image shows a screenshot of a web application interface. At the top, there is a search bar and a navigation bar with several tabs: 'Feed', 'Conversation', 'Details', 'Transfer Case', 'Resolve Case', 'Article Request' (which is highlighted with a blue box), 'Account/Partner Info', 'Attachments', and 'More'. Below the tabs, the main content area is titled 'KnowledgeArticleRequestFlowForCase'. It contains a form with the following fields: 'Case Number', 'URL', 'Case Owner Name', and 'Case Owner Email'. The 'Case Owner Email' field is populated with the text 'waleigh.presnell@avalara.com,invalid'.

Figure 6. Support agents can request a KCS support article with the click of a button, kicking off a highly-automated request and fulfillment publishing workflow.

In conclusion

While some may dismiss this as an idealistic vision of a distributed, integrated, and collaborative operations management system, it's far from mere speculation. This is the foundation we've established at Avalara, a system that not only exists but is continuously evolving and expanding its capabilities. One potential future development could involve leveraging knowledge graphs to map content operations directly to content, unlocking insights that were previously unattainable.

However, the challenge lies in the fact that this system is not a ready-made commercial product available for licensing. It's a custom solution, crafted to meet specific needs, and as such, it requires a dedicated effort to build from the ground up. Many organizations would eagerly adopt such a system if it were available off the shelf, but unless they can justify the investment in developing such a system internally with their content engineering teams, a gap remains in the market.

To bridge this gap, there's a pressing need for a collective call to action directed at commercial content system providers, urging them to develop and offer a solution akin to what has been achieved with

Content Central. This call should be loud and clear, highlighting the demand for a sophisticated, integrated content management solution. Alternatively, practitioners could unite to create an open-source version of Content Central, providing a platform that content technology vendors could integrate with, thereby democratizing access to advanced content management capabilities.