



The Multi-State Architecture of Digital Commerce

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Abstract

The digital economy has reshaped how services are delivered, accessed, and experienced. Activities that were once performed and received in identifiable locations now unfold across cloud infrastructure, mobile networks, and remote work environments that span multiple jurisdictions simultaneously. As a result, longstanding assumptions underlying market-based sourcing regimes are under increasing strain. This article provides a descriptive examination of the operational architecture of digital services and explains why customer location has become an increasingly unstable indicator of where service benefits are realized.

The analysis does not offer legal interpretations or policy recommendations. Instead, it focuses on how digital services actually operate and why their distributed nature complicates multistate sourcing analysis. By shifting attention from taxpayer behavior to system design, the article clarifies the structural challenges inherent in applying geographic sourcing concepts to a stateless digital economy.

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Why Modern Systems Complicate Nexus and Sourcing Analysis

Summary

Digital services no longer operate within clean geographic boundaries. Services are delivered through cloud-based platforms, accessed remotely, and used by individuals and teams across multiple states simultaneously. These operational realities complicate traditional assumptions embedded in market-based sourcing frameworks, particularly those that rely on customer location as a proxy for where service value is received. This article examines how modern digital services function in practice and why their operational design makes geographic attribution increasingly difficult. Rather than interpreting statutes or proposing policy solutions, the discussion focuses on system architecture, enterprise usage patterns, remote access, and centralized billing

structures that influence sourcing outcomes. By grounding the analysis in how digital services are actually delivered and experienced, the article offers practitioners a clearer lens for understanding why sourcing in the digital economy often depends on approximation rather than precise location-based determinations.

Introduction

State tax systems were developed in a commercial environment where economic activity could be observed and located with relative clarity. Businesses operated from identifiable offices, services were performed in specific places, and customer engagement was often tied to fixed geographic locations. Under these conditions, nexus and sourcing rules functioned as tools for mapping economic activity to place. Digital commerce has quietly reshaped those assumptions.

Modern businesses increasingly operate through cloud infrastructure, distributed computing environments, and digital platforms designed to function across jurisdictions simultaneously. A single transaction may involve data processing in one state, system routing in another, and user interaction across several more. These transactions do not unfold within clean geographic boundaries, even though tax frameworks continue to rely on geography as a central organizing principle. Practitioners and administrators applying nexus and sourcing rules to digital transactions often encounter analytical difficulty—not because the rules are unclear, but because the structure of digital commerce does not align neatly with location-based frameworks. The challenge is structural rather than interpretive. This article provides a descriptive analysis of the multi-state architecture underlying modern digital commerce and explains why these structural characteristics complicate traditional nexus and sourcing analysis. The discussion does not interpret statutes, evaluate enforcement practices, or propose policy changes. Instead, it focuses on how digital systems operate in practice and why those operational realities introduce complexity when applying location-based tax concepts.

From Location-Bound Commerce to Distributed Operations

Traditional nexus and sourcing concepts emerged from materially grounded business models. Economic

activity was generally tied to where employees worked, where services were performed, or where goods were delivered. Even when transactions crossed state lines, they often left physical or administrative markers that could be traced to specific locations. Digital commerce departs from this model in meaningful ways. Many digital services are delivered through platforms that rely on distributed infrastructure rather than centralized facilities. Computing resources are allocated dynamically, data is processed across multiple regions, and system performance is optimized regardless of jurisdictional boundaries. This shift does not eliminate geography from commercial activity, but it changes how geography interacts with it. Instead of being embedded in a single place, transactions unfold across interconnected systems spanning multiple locations simultaneously. Geographic signals still exist, but they are indirect, fragmented, and often incomplete.

Understanding this transition is essential to understanding why applying traditional nexus and sourcing concepts to digital commerce has become more complex.

The Architecture of Digital Commerce

Digital commerce operates through layered systems, each of which may implicate different jurisdictions. No single layer fully captures where economic activity occurs.

Infrastructure Layer

At the foundation is the infrastructure layer, consisting of data centers, servers, and network resources. These components are often geographically dispersed and managed to ensure reliability, redundancy, and performance. Data may be stored or processed in multiple locations depending on system demand.

From the customer's perspective, the location of infrastructure is largely invisible. Services appear seamless regardless of where underlying resources are physically situated. Routing and Processing Layer Above the infrastructure layer is the routing and processing layer. Digital systems route data dynamically, balancing loads and adjusting pathways in real time. Transactions may be split, replicated, or rerouted as part of routine system operations.

Routing decisions are driven by technical considerations such as latency and capacity, not by market location.

As a result, processing activity may span multiple states even when the user is stationary.

User Access Layer

At the user level, digital services are accessed through devices and networks that may change frequently. Users may log in from offices, homes, or mobile locations, sometimes on the same day. For enterprise customers, access may occur simultaneously across many states. User location is often the most visible geographic signal, but it is also the most variable. It may not align with billing arrangements, contract terms, or organizational structure.

Interaction and Value Layer

Value is realized through interaction with the service over time. Unlike traditional services, which are performed at a specific time or place, digital services often provide continuous access and functionality. The service's benefits may be distributed across users, locations, and billing periods.

Together, these layers illustrate why digital transactions resist geographic simplification. Each layer introduces its own geographic footprint, and none alone provides a complete picture of where economic activity occurs.

Multi-State Engagement Without Physical Footprints

One defining feature of digital commerce is the ability to reach markets across multiple states without establishing a traditional physical footprint. Businesses may have no employees, offices, or tangible property in a state, yet still interact extensively with users located there. This capability has implications for nexus analysis. While economic presence concepts have expanded the scope of state taxing authority, evaluating market engagement in a digital environment remains complex. Interactions may be mediated through automated systems rather than through localized business activity.

Digital platforms can scale rapidly and enter new markets with minimal incremental investment. Market engagement may be reflected in user access, data flows, or system interactions rather than in physical operations. As a result, nexus analysis increasingly relies on proxies that approximate engagement rather than on direct observation of in-state activity.

Implications for Nexus Analysis

Applying nexus standards to digital commerce requires reconciling location-based legal concepts with system-based operational realities. Traditional indicators of nexus—such as employees or service performance—may be absent or only loosely connected to digital market engagement. Economic nexus frameworks address part of this gap by focusing on market access rather than physical presence. Even so, determining how to evaluate engagement when transactions are distributed across multiple states remains challenging.

Transaction thresholds, revenue measures, and user metrics serve as tools for approximating market participation. These tools provide administrable standards, but they do not map precisely onto the architecture of digital commerce. As a result, nexus analysis often involves judgment informed by indirect signals rather than by clear geographic markers.

Implications for Sourcing Analysis

Market-based sourcing rules generally seek to attribute receipts to the location where the customer receives the benefit of the service. In digital commerce, identifying a location can be ambiguous.

Enterprise customers may have users spread across multiple states, with usage patterns that change over time. Billing addresses, contract locations, or headquarters addresses may reflect administrative convenience rather than actual service usage. In practice, sourcing often relies on assumptions that approximate benefit rather than directly measures it.

These approximations are not inherently problematic, but they highlight the limits of applying location-based concepts to distributed systems. Different reasonable proxies may yield different sourcing outcomes, even when used consistently and in good faith.

Administrative and Compliance Context

The multi-state architecture of digital commerce presents practical challenges for both taxpayers and tax administrators. Systems designed for operational efficiency are typically not built to generate jurisdiction-specific tax data. Creating such data may require significant system modifications and ongoing maintenance. From an administrative perspective, evaluating nexus and sourcing positions requires understanding

how digital systems function. Without that context, disagreements may arise from differing interpretations of how existing rules interact with modern operational structures. Recognizing the architectural features of digital commerce helps frame these issues as questions of system design rather than questions of compliance intent. Complexity, in this context, is an inherent feature of the commercial environment rather than an anomaly.

Conclusion

The challenges digital commerce poses for nexus and sourcing analysis are best understood as structural. Modern digital transactions operate through layered systems that span multiple jurisdictions simultaneously, weakening the connection between economic activity and discrete geographic locations.

Describing the multi-state architecture of digital commerce does not resolve these challenges, but it provides a clearer analytical foundation for evaluating them. In an economy where services are accessed through distributed networks rather than delivered

to places, applying location-based tax concepts necessarily involves judgment and approximation.

As digital commerce continues to evolve, understanding how transactions are structured and experienced across state lines will remain essential to consistent, transparent tax analysis. Recognizing the limits of geographic attribution is a necessary step toward applying existing frameworks with clarity in a distributed commercial landscape.

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