Toward a Conceptual Foundation for Service Science: Contributions From Service-Dominant Logic

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Toward a conceptual foundation for service science: Contributions from service-dominant logic

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Advancing service science requires a service-centered conceptual foundation. Toward this goal, we suggest that an emerging logic of value creation and exchange called *service-dominant logic* is a more robust framework for service science than the traditional goods-dominant logic. The primary tenets of service-dominant logic are: (1) the conceptualization of service as a process, rather than a unit of output; (2) a focus on dynamic resources, such as knowledge and skills, rather than static resources, such as natural resources; and (3) an understanding of value as a collaborative process between *providers* and *customers*, rather than what producers create and subsequently deliver to customers. These tenets are explored and a foundational lexicon for service science is suggested.

INTRODUCTION

Not surprisingly, given its origins in the Industrial Revolution, the current language of commerce and exchange was built on an economic philosophy in which exchange was conceptualized principally in terms of tangible units of output.[1,2] Manufacturing-oriented words such as *product, production, goods, distribution, supply*, and *consumption* characterize the lexicon associated with this philosophy. Such words, by their nature, relegate service (often referred to as "services") to a supporting, secondary role. As *service science* emerges as a scientific discipline, it requires its own conceptual framework, one that will encourage the building of a distinctive and robust *science of service.*

Definitions of service science include reference to the study of service systems. According to Spohrer et al., a service system is a "value-coproduction configuration of people, technology, other internal and external service systems, and shared information (such as language, processes, metrics, prices, policies, and laws)."[3] Additionally, Wladawsky-Berger notes that service systems overlap significantly with "market-facing complex systems" and thus generally involve economic exchange.[4] Hence,

a conceptual foundation for service science based on market exchange processes is needed. In these processes, people interact, innovate, and learn and technologies evolve—that is, function as an exchanging, adaptive, and evolving service system. Therefore, the proposed conceptual foundation, in order to be consistent with the Spohrer et al. definition, is service-centered and draws upon marketing science. Importantly, the framework presented identifies service, the process of using competences to benefit another, as the fundamental purpose of economic exchange. Consequently, this framework can help position service science as a central and promising area of knowledge development and dissemination to advance the well-being of individuals, firms, and nations.

During the last 100 years, marketing science has grown to encompass the study of *positive* issues, such as how firms and customers go to market, and *normative* issues, such as how firms should market to customers. Recently, a revised perspective of markets, organizations, economic exchange, and marketing has emerged. This perspective, with a framework of value creation built on *service provision*, rather than *goods production*, has been challenging and potentially transforming marketing thought and practice. This new logic has become known as *service-dominant* (S-D) logic.[1,5–9] S-D logic can be contrasted with the more-traditional *goods-dominant* (G-D) logic.

After reviewing in the next section the historical basis of G-D logic and contrasting it with S-D logic, we discuss how S-D logic provides a conceptual foundation for service science. This foundational lexicon is built upon the concepts of operant resources, "resourcing" (i.e., resource creation, integration, and resistance removal), servicing and experiencing, value proposing, dialog, value-creation networks, learning via exchange, and collaborative marketing.

G-D VERSUS S-D ORIENTATION

As might be expected, the emerging discipline of service science was originally guided by a neoclassical model of economics, the traditional model of exchange and commerce. This model seeks equilibrium and maximization of profit and utility. It is heavily focused on the efficient production of (preferably tangible) goods that are embedded with value through a change in form during the manufacturing process. Thus, it advocates standardiza-

tion, production away from the market and the interference of customers, and storage of output until sale. In this model, distribution and marketing have the role of adding value by producing place, time, and possession utility. However, with manufacturing and marketing processes, as well as with engineering science in general, the strong focus was on design for efficiency and not market effectiveness. As we will explain, S-D logic has a greater focus on effectiveness.

The traditional model reflects a G-D logic orientation of value creation; it is concerned with the production of units of output. Because of this orientation, in early studies of markets and economic exchange, service was all but ignored. Later, it was treated either as an add-on to the core good or as a residual, intangible output (i.e., whatever could not be defined as agriculture, mining, or manufacturing was labeled *services*). Over time, services became characterized as products that are differentiated from goods in terms of four relative shortcomings known as the IHIP characteristics: intangibility, heterogeneity (inability to standardize), inseparability (of production and consumption), and perishability (inability to be inventoried). For an example of this characterization, see Reference 10.

This view of services as either an add-on or a somewhat less-than-desirable, intangible good is evident in the plural designation "services," reflecting units of output.[1,11–12] It points service scientists toward a primary concern with the efficient production of intangible goods, rather than the effective creation of value through service. This orientation can be contrasted with the orientation implied by the singular service, which connotes a process of doing something for and in conjunction with another party. This subtle but critical distinction underlies the difference between G-D logic and S-D logic.

In S-D logic, service is defined as the application of specialized competences (knowledge and skills) for the benefit of another entity, rather than the production of units of output.[5] These benefits are always manifested in the context of the customer, rather than in the production of its offering by the provider. The contextual perspective suggests that what firms provide should not be understood in terms of outputs with value, but rather as resource inputs for a continuing value-creation process. Even

in the software industry, we can witness the G-D paradigm when the value of software is measured in lines of code. This is changing, however, as indicated in Constantine and Lockwood's approach to software engineering.[13] Here the focus is on the software use and the behavior of the user of the software. Software for use focuses on "a structured narrative, expressed in the language of the application domain and of users, comprising a simplified, generalized, abstract, technology-free and implementation-independent description of one task or interaction that is complete, meaningful, and well-defined from the point of view of users in some role ... in relation to a system and that embodies the purpose of intentions underlying the interaction." (Reference 13, p. 103)

S-D logic implies that "producing" should be transformed into "resourcing." Resourcing allows value creation through collaborative value cocreation, not only involving the provider and the beneficiary but all parties in a value-creation network. Goods remain important in S-D logic, but they are seen as vehicles for resource transmission (what some call appliances or tools), rather than containers of value. Fundamentally, this is what is behind the software-as-a-service movement and service-oriented architecture.

This resourcing conceptualization of service connects well with the concept of service systems as market-facing complex systems (see, for example, Reference 4). More generally, the process orientation brought about by the singular "service" versus plural "services" also connects well with the centrality of service in service science. This reorientation is reflected in the recent shift to the designation "service science," in contrast to early designations of "services science."

CONCEPTUAL FOUNDATIONS FOR SERVICE SCIENCE

S-D logic, with its process and resourcing orientation, offers a perspective for a conceptual foundation of service science, management, and engineering (SSME), as illustrated in *Table 1*. A critical element of S-D logic involves rethinking the meaning and role of resources. The key distinction is between operand and operant resources.[5]

Operand and operant resources

G-D logic is largely oriented toward operand resources. Operand resources are those that are acted

Table 1 G-D logic versus S-D logic: A change of perspective

From: G-D Logic	To: S-D Logic
Operand resources	Operant resources
Resource acquisition	Resourcing (creating and integrating resources and removing resistances)
Goods and services	Servicing and experiencing
Price	Value proposing
Promotion	Dialog
Supply chain	Value-creation network
Maximizing behavior	Learning via exchange
"Marketing to"	Collaborative marketing ("marketing with")

upon; they are static and usually inert. They require other, more dynamic resources to make them useful. Most natural resources are operand resources. Because many of these resources are often necessary for human well-being and are also capable of being transported, they have historically been the focus of human pursuits, particularly wealth creation and exchange. For example, since the dawn of civilization, nations that accumulated the largest stockpile of operand resources were often considered the wealthiest. Smith reconceptualized the creation of national wealth in terms of the import of natural operand resources through the export of manufactured operand resources (products).[14] More than 200 years ago, Malthus viewed the well-being of the human race in imminent danger because of population growth and the concomitant scarcity of natural (operand) resources.[15]

This primary focus on operand resources by organizations embracing a G-D philosophy is reflected in firm behavior. For instance: (1) organizations have historically been viewed primarily as manufacturers that exchange goods (operand resources); (2) the customer was usually seen as an operand resource, "something" to be segmented, penetrated, distributed to, and promoted to; (3) assets were conceptualized as being obtained from the tangible resources upon which firms perform value-adding activities; and (4) traditionally exchange was seen as a method for maximizing profits

for use in acquiring more goods, in order to build up the balance sheet with (largely tangible) operand resources.

By contrast, S-D logic has a primary focus on operant resources. Operant resources are often intangible

> ■ In service-dominant logic, value creation occurs when a potential resource is turned into a specific benefit, an activity known as resourcing. ■

(e.g., knowledge and skills) and are capable of acting on operand resources and even other operant resources to create value. However, S-D logic recognizes that many potential resources, and especially potential operand resources, are neutral (or perhaps even a resistance) until humans learn what to do with them.[16] Thus, as S-D logic emphasizes,[5] resources are not; they become, through the application of operant resources. Perhaps this notion is best illustrated by the history of the microprocessor: silica (silicon dioxide), when coupled with the ingenuity of Carver Mead and others, enabled humans to create the computer on a chip.

Because operant resources, by definition, produce effects, they enable value-creation through the transformation of inert natural resources (as well as other operant resources). Silica is a neutral or inert matter; it became an operand resource only after humans acted upon it. Now the computer, which is based on this resource, has become a tool to leverage human capital, the same way axes, plows, and bows and arrows had beforehand. Not only does it allow us to leverage our minds, but we also have embedded it into machines (e.g., robots) that replace human physical capital. As Gilder states, "… by collapsing the computer to invisibility and imbedding [sic] it in the matter of everyday life, man may impregnate the world with his mind and waken it to the sound of its master's voice."[17]

The conceptual foundation for SSME can be enriched by distinguishing between operand and operant resource because service systems, which include both types of resources, are driven by

operant resources, rather than the operand resources of G-D logic. However, for operand and operant resources to be fully appreciated, it is useful to explore further the concept of "resourcing."

Resourcing

Economic activity is a function of specialization and exchange.[2] In G-D logic, value creation is associated with resource acquisition—primarily operand resources. In the G-D worldview, the firm specializes in the production of a type of good, the household specializes in a type of labor, and the money the household obtains from its labor is exchanged for the goods produced by organizations. In this case, one acquires the resource of the other: the firm seeks the labor from the household and the household seeks the goods the firm possesses. Under S-D logic, however, value creation occurs when a potential resource is turned into a specific benefit. This activity, which is termed resourcing, has three essential aspects: resource creation, resource integration, and resistance removal.

Resource creation, of either operand or operant resources, always involves human knowledge and ingenuity, which are themselves operant resources. For instance, up until the mid-1850s petroleum was viewed as a useless substance, or even an obstacle to be avoided. This substance only became a resource upon the proper human appraisal and application of knowledge and ingenuity. It is important to recognize that resource creation is not limited to scientific laboratories in industry and in universities, but is pervasive throughout society. For example, at a very basic level the functional unit of society, the family, creates operant resources. Families create knowledge, share knowledge, and develop competences in offspring and are a resource to members.

A second aspect of resourcing is resource integration. Resource integration is a basic function of all service systems (e.g., firms, households, and governments). At the firm level, organizations can be viewed as resource integrators, which transform microspecialized competences (employee-level skills and knowledge) as well as other internal and market-acquired resources into service provisioning. Novel ways of resourcing can be a source of innovation. For instance, when IBM developed the modular architecture for the IBM System/360* family of computers, it was pioneering a new form

of resource integration. Separate teams worked on subspecialties from memory to instruction processing to printing and their work with others occurred through simplified interfaces.[18] In the end, the IBM System/360 had interchangeable parts that could be extended to other applications. Today, companies like Dell, Inc., are essentially resource integrators using and benefiting from this modular architecture approach.

Whereas resources are not always inherently complementary, they can be made to be complementary through the development of knowledge that allows them to be integrated and developed (see Reference 19, p. 108). The general principle is that resources do not have intrinsic value, but rather are valued when integrated and positioned through resource-based, value-creating networks, including the networks of the customer. Consider the value created by Web sites such as Google, Craigslist, eBay, Wikipedia, MySpace, YouTube, or Amazon.com when linking people through the resources of the Internet.

When one considers how households use goods, it becomes clear that households (and individuals) are also resource integrators. In a market-based system, the goods a firm possesses have a *value in exchange*; that is, they can be traded for financial or other resources. However, these resources have little or no *value in use* to the household unless they are integrated with other resources. And the real value to households is in the use of goods. Consider a new automobile without gasoline, a place to park, a road system and the laws governing roads and driving; or consider an airline ticket for two to a romantic location but no one with whom to share it.

Another aspect of resourcing is the removal of resource resistances. There are often barriers (tangible and intangible) or resistances that must be removed before potential resources can be made useful. For instance, for petroleum reserves below 50,000 feet, the inability to effectively drill at that depth is a resistance. Resistances need not be physical; they can often be intangible, such as cultural resistances. The multidivisional, multifunctional organization emerged in the early 1900s as a way to organize job functions and activities in the firm. These organizations had a strong hierarchy and became known as *command-and-control* organizations. As they grew in size they also became

highly bureaucratic. Consequently, this type of organization is not very conducive to generating technically complex innovations. One of the first to recognize this was the Hewlett-Packard Company (HP), which in the late 1960s pioneered a bottom-up approach to project formation in which employees are empowered and given flexibility to lead self-organized projects. In so doing, HP removed the bureaucratic resistance to innovation efforts.

Removal of resistances is a process that involves not only firms or those offering the service, but also consumers, users, or beneficiaries. In fact, the barrier to resource creation is often the removal of user or customer resistances. These resistances are almost always intangible and attitudinal in nature. For example, the negative attitudes certain individuals or population segments have toward education or healthy foods prevent them from benefiting from educational or nutrition resources, respectively.

Servicing and experiencing

G-D logic views the primary focus of the firm as the production of outputs to be sold to customers. Traditionally, this output has been conceptualized in terms of tangibles (goods), intangibles (services), or some combination of these. This output-centered thinking was so pervasive that even "services" firms sought to become and were advised to become more manufacturing-like—for example, to become "service factories."[20] These service factories tried to standardize services by borrowing concepts from manufacturing. Instead of assembly lines, there were lines or stations that customers visited to receive services. Because production efficiencies could be obtained from employee specialization, even customer service became specialized. Because capital investment in equipment led to improved manufacturing productivity, machines (such as call answering, menuing, and routing machines) were introduced into the service factory, resulting in machines, rather than employees interacting with customers.

By comparison, S-D logic focuses on the interaction between the firm and the customer. The significance of that interaction is found not in the transfer of ownership of output (as in G-D logic), but in the interaction itself, in servicing the needs of the customer, as experienced by the customer in the unique context of his or her own life and purpose for seeking a market exchange.[21] That is, market

interactions are more generally concerned with solutions and phenomenological events than ownership.

In relation to the prior service factory examples, an S-D mind set would focus on understanding the

> ■ In service-dominant logic, the supply chain is reconceptualized as a network of service systems. ■

customer's experience of waiting in line and moving from station to station, on the experience of waiting on a call line and then being transferred multiple times, on the experience of talking to an employee who is not empowered to provide service. It would focus on the effectiveness of responding to the customer's purpose for contacting the firm, rather than the efficiency of producing the services. In other words, efficiency should follow effectiveness. This perspective prompts the organization to consider not only its employees' productivity but also the "productivity" and experience of the customer.[22]

A focus on user experience can drive service innovation. For example, Steve Jobs did not invent the desktop computer; putting together hardware and software in a small package was done by others. Steve Jobs had the vision to create compelling experiences for the customer through the use of technology.[18] It was his vision of making the desktop computer a "personal" experience—an early marketing slogan of Apple, Inc., read "A personal computer is like a bicycle for the mind"[18]—that led to the birth of the personal computer. In brief, even when goods are involved, their role is that of an appliance and it is in its use and interaction that servicing and experiencing occurs.[23]

Value proposing

As noted, a G-D orientation views the central purpose of the firm as producing and selling outputs. Coincidental with this orientation is the belief that value is created by the firm and delivered to customers. This, in turn, informs the firm to focus attention on revenue chasing (*value in exchange*) as a dominant pursuit. Not surprisingly, firms therefore conclude that to produce more revenue they need to manufacture and sell more units of output.

S-D logic, however, views the customer not as a buyer of valuable output created by the firm, but as an integrator of inputs provided by the firm with its other resources to create value (see References 24 through 26). Because it is the customer who integrates resources to create value (a value that is uniquely determined by the customer), S-D logic recognizes that a firm cannot create value.[5] This is compatible with a conceptualization of a service system as a "value-coproduction configuration(s)."[3] It follows that if firms cannot create value (i.e., can only cocreate it) they can only position themselves through value proposing.

The idea of value proposing recognizes that value is a composite of benefits and burdens (or costs) that unfold as the customer integrates the firm-provided resources, often over time. Stated alternatively, the trading off of benefits versus burdens occurs in the customer's personal realization of the value proposition, rather than prior to, or at time of, payment or commitment to pay (value in exchange). For instance, in IT outsourcing, the service agreement can involve information, risk, and gain sharing that unfolds over time, processes to integrate competences across the organizations, and cocreated guidelines for scaling the service system to obtain efficiencies. Increasingly, in IT outsourcing the firm and the customer are cocreating a value proposition that defines these elements and establishes expectations. In brief, firms do not produce value; they can only make value propositions and then, with the customer as a collaborator, cocreate value if the proposition is accepted. For competitive advantage, these value propositions should be more compelling than those of competitors.[5]

Dialog

In G-D logic, customers are usually viewed as operand resources to be acted upon—that is, to be segmented, targeted and penetrated through promotion. This promotion, which is one-sided and intended to persuade the customer to purchase the output of the firm, can be viewed as propaganda, rather than a two-way exchange between the producer and the consumer.

In S-D logic, the customer is an operant resource and someone with whom the firm can cocreate value. This implies developing a dialog between parties that is founded on trust, learning together, and adaptation to each other.[27] It aims "at developing an

understanding of each participant's point of view, and interaction sets up suitable conditions for listening and learning together. Dialog in marketing is much more than alternating monologues and covers the joint investigation of needs, wants, desires, problems, issues, and decisions to be made" (see Reference 28, p. 229).

This dialog is not the one-to-one dialog that one often envisions, but "many to many."[29] In large part, this has become possible, or at least more apparent, because the Internet has become a public resource through which communities of customers and other stakeholders can engage in dialog without the active participation of the firm. Some argue that the market itself is a conversation.[30]

Value-creation networks

Given the history of G-D logic and its ties to manufacturing, it is natural that the use of the resources necessary for value creation was conceptualized in terms of a linear supply chain. As long as operand and operant resources tended to move coincidently—that is, information and know-how were not generally exchanged apart from goods—the model probably worked sufficiently well and these supply chains could be characterized in terms of physical gaps between buyers and sellers. These gaps were between: (1) the timing of source of supply and demand for the supply; (2) the geographic location of sources of supply and the location of production or consumption; (3) the heterogeneous supplies found in nature and the homogeneous production inputs needed in manufacturing; and (4) the limited assortment of any manufacturer and the diverse assortments demanded by customers. Wholesalers, jobbers, distributors, retailers, agents and brokers and facilitating channel institutions (e.g., transporters, warehousers, insurers, or bankers) emerged in a tightly linked vertical structure (i.e., a chain) to close these gaps. Although the supply chain was envisioned as something physical, the real source of wealth and value was in the knowledge and information (operant resources) embedded in the tangible materials and used by the intermediaries to close these gaps.

Today, it is increasingly possible to exchange information apart from goods—that is, to "liquefy" information in Normann's terms.[19] Thus, most supply-chain concepts today are inadequate. Liquefying information changes the location and nature of

work and the connectivity of resources. Consider desktop manufacturing, where a three-dimensional object fabricator can lay down successive layers of material to produce goods on demand. The machine enables one to digitally transmit the engineering specifications for a replacement part and have it produced in a customer's home or office. In so doing, virtually all of the energy required to move goods through a supply chain is unneeded.

Because of the increasing ability to liquefy information, there are also ever-increasing opportunities to concentrate on specific competences and to outsource the application of complementary competences. Essentially, everything on the income statement of a firm (or household or public entity) and balance sheet (i.e., all expenses and assets) can potentially be outsourced.

This requires reconceptualizing the supply chain in terms of a network of available service systems, each representing distinct (mostly operant) resources. Because networks are not limited to linear, vertical arrangements, but can be arranged in an infinite number of ways, their configuration can become a major source of innovation and competitive advantage. That is, it suggests new opportunities for configuring all the resources that are necessary to solve a given problem or what Normann calls "density creation."[19] For instance, a firm can serve as a value-creation network architect, rather than a manufacturer.

This is essentially the role Nike, Inc., has taken. It does not manufacture or even handle much of the physical movement of tangible goods but, rather, applies its competences to design products, build brands, and marketing, while outsourcing most other functions. Importantly, it also includes the final customer in this value-creation network. That is, customers promote the Nike brand by having the logo prominently displayed on apparel they have purchased. Thus, customers simultaneously cocreate the brand and value for themselves, since the brand becomes a resource for defining their own identities.

Exchange as learning

As noted, guided by the neoclassical economic paradigm, G-D-oriented firms strive to maximize profits through price setting, and the customers they serve are viewed as rational, utility maximizing

actors. Arguably, this works reasonably well in a relatively static world because, even if a firm does not get it right initially, it can eventually find a profit-maximizing price. However, in a situation in which it is increasingly essential to understand service systems as complex adaptive networks, maximizing behavior is an elusive, if not misleading, goal.

With the utility maximizing customer of neoclassical economic theory, products represent bundles of attribute-based utilities and, therefore, the customer could be seen as allocating its scarce resources to get the best bundle. Two problems arise with this approach to decision-making. First, value-in-exchange might represent expected utility but it is not the actual utility; utility (value-in-use) can only be realized by and in the context of the life of the customer—that is, customers are not value destroyers (consumers), but rather value creators.[31] Second, the realized utility is always considered on a relative basis, that is, relative to other market offerings and experiences. Because of the dynamic nature (especially today) of value networks resulting in (accelerated) opportunities for innovation in the design of market-facing service systems, the value-creation potential of resources available to the firms is constantly in flux. Thus, maximization of utility, like the maximization of profit, is an elusive, if not misdirected goal.

The process of resourcing to create experiences that allow value creation applies to all social and economic actors (i.e., "firms" and "customers"); and it is fundamentally a learning process. Typically, the resourcing process draws in both market-facing and non–market-facing resources but always involves exchange (economic or social, or both). These exchanges are grounded in knowledge discovery because the purpose of exchange is to improve resourcing capability and well-being.[7] In these exchanges the entities have simple hypotheses based on desires and expectations—that is, if a value proposition is accepted, they will be better off. These hypotheses can be falsified, thus providing contribution to learning.

In the case of the firm, one of the most important metrics of this feedback (learning) loop is financial outcome—that is, financial flows allow entities to learn how they are doing. Thus, whereas S-D logic places a strong emphasis on value in use and value

cocreation, it does not ignore value in exchange, especially since exchange (including socially embedded exchange) is increasingly moving toward economic exchange. Thus, cash flow is tied to resourcing; when cash in exceeds cash out, the entity is getting a signal that it is doing better at its resourcing efforts.

Collaborative marketing

When formal marketing thought developed in the early 1900s, marketing was viewed as the function of taking goods and services "to market." In fact, the American Marketing Association initially (in the mid–1930s) defined marketing as the set of business activities that direct the flow of goods and services from producer to consumer. After World War II, marketing thought in the U.S. moved to a "marketing to" orientation in which the market and customer were researched and analyzed and then products were produced to meet customer or marketplace needs. However, under this "marketing concept," the customer was viewed an operand resource—a resource to be acted on. That is, G-D logic remained and the customers were segmented, targeted, promoted to, distributed to, captured, and then enticed to continue to purchase by sellers using heavy promotional programs where transparency was the exception. The underlying notion was value distribution.[32]

In contrast, S-D logic views the customer as an operant resource and, thus, a collaborative partner with whom value is cocreated. This implies a "marketing with" approach.[5] Whereas the "marketing to" philosophy treats the customer as exogenous, the emergent "marketing with" philosophy views the customer as endogenous and as a collaborative value-creation partner.

Central to this business philosophy is the adoption of collaborative processes and methods as well as collaboration as a general philosophy of business. Some of this thinking is reflected in closer working relationships, alliances, joint ventures, partnerships and an overall trend toward outsourcing. This is occurring not only between market-facing service systems but also other private and public service systems.

CONCLUSION

We argue that a conceptual foundation of service science based upon S-D logic has the potential to

become the platform from which to properly view organizations as service systems.[3] We believe that S-D logic provides a framework for theorizing, confirming, and refining the theoretical foundation of service science. To have evolutionary potential, however, both S-D logic and service science must be cocreated. We therefore invite others to help create the appropriate conceptual foundation for this new science.

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