Theory of mechanical information

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Radiant objects

The element of theory that first circumscribes a record of data, Atomism would envelop the success of object oriented programming languages, and predict the significance of distributed objects to network topology.

A **radiant object** is an atom in the field of a distributed object topology. It has a globally unique resource identity (GU/RID) which is self identified and version independent. It has typed or structured data, including references to other radiant objects, to form structures in distributed data. And, it has interfaces and semantics to form protocols interacting in distributed processes.

The mechanical space-time field is a possibility space founded on message passing. The data message is spatial, and its processing is temporal. By the application of study and reflection we arrive at

theory and practice to develop the mechanical space-time fabric to the study of distributed objects.

This scholarly objective condenses the data message to a topological atom, and the mechanical topology to the space-time field of existence for atomic objects.

Location is defined by topology, like communication. A mechanical space-time fabric defines the existence of distributed objects by realizing location and communication.

Topology

Distributed over communications links, a topology is a graph or network of connections that facilitates an objective (*i.e.* point to point, or point to multipoint communication). The term is employed where traversal is significant to the analytical framework, where the connectivity of a graph is a point of focus.

A topology has a dual substance of significance. Relative to the mechanical space-time fabric of hardware, a network topology exists as a data processing application. Relative to the mechanical space-time fabric of internetworking systems, it is a facility of space and time.

We elect to assign the spatial resources of topological data, and the temporal resources of topological software, to the frame of analysis when we focus on the distributed object as an atom in a topological space-time field. In doing so we have separated the topology and its objective into two distinct frames of analysis. We identify a topology as a "field" that remains abstract because the frame of analysis that focuses on topology is relatively abstract, and therefore it is natural and useful to represent topology as abstract, and to employ terms of abstraction in the description of topology.

A first topological problem is distributed object location and retrieval, as necessary to distributed data structures, or object location and interaction as necessary to distributed information processing. Given a network of communication, which traversal satisfies an objective?

A second topological problem is object distribution in spatio-temporal systems. The location and behavior of objects in spatio-temporal systems can simulate population migration due to climate change, or ideological subscription due to competitive disadvantage.

In other words, "the network is the computer" is condensed by an application of Atomism to focus on the radiant object in the framework of a mechanical

topology. In this perspective, the microkernel is a milestone in the collapse of nondeterministic commodities onto deterministic components. And, the tape and choice machines are milestones in the development of formal methods.

Determinism represents stronger knowledge of objective satisfaction, while nondeterminism represents weaker knowledge of objective satisfaction. In terms of distributed socio-economics, determinism represents collective stability, and nondeterminism represents global dynamicism (*i.e.* tolerance of change).

Host

One possible communications topology is the internet protocol [IP], our most prolific communications topology. The info-mechanical hardware is organized into network host and router nodes on network edge links, located by edge node addressing, and connected by edge channels and node routers. The IP routers are statically addressed nodes with periodically updated edge neighbor address maps. A deterministic topology is resource distributed among dedicated routers.

This host topology is intended to provide a transient message passing layer over heterogeneous hardware

and under an open world of applications to benefit the communication of digital information. The object of the design is purely topological, which design program has been successful in yielding a global communications network unencumbered by design barriers to access or design thresholds to utility.

In the perspective of avenues for the development of distributed object topologies, the internet host technology is a method of communication capable of solving every problem except the out of band communication problem dictated by some solutions to security problems. However, there are burdens due to exploitation that inhibit access and utility. And, there are cases in which utility is negative due to malice and avarice.

Trust

One possible object topology is a distributed social network. A **distributed trust network** is a social topology defined by the interpersonal sharing of asymmetric keys (*e.g. via* private, *ad hoc* networking). The possession of someone's public key represents the relatively invested association of a social graph edge.

When the association is technically endowed with a practical communications channel, the social graph

becomes a communications network. The set of technical associations to each individual, including key, name, and link, is a node in the trust peer social network. The set of social associations to each individual has a radiating (star) connectivity in the topology of the social network graph.

The social graph node object has a communications link. It is a point to point channel intended to communicate objects of data and interaction. Therefore the social network is a mechanical space-time topology. However, unlike a host topology, a social topology is characterized by cyclic connectivity. A message broadcast to every possible link to cover the topological graph exhaustively would cover a host topology redundantly.

Reachability in distributed trust is determined by the graph of social trust relationships. “If I don’t know you, my friends don’t know you, and their friends don’t know you, I cannot find something you have published.”. This property of distributed trust networks contradicts the deterministic retrieval objective of the main volume of research in distributed data systems. Deterministic retrieval on a distributed trust topology is an expensive elective: possible but rare. Which gives distributed trust a nondeterministic topological character.

The distributed social trust network is a topology endowed with an important degree of transparency in resource distribution. Resource consumption has proportion to the social network. Other topologies would be opaque in comparison.

Names

A first distributed database would be applied to name space. Since the domain name system [DNS] was abandoned to the exploitation demonstrated by price collusion, a replacement has been examined in terms of resource distribution. Deterministic retrieval over a distributed universe requires replication. Each data record must be copied in as few as three instances. The cost of deterministic resource distribution is relatively opaque.

The distributed trust network has a natural namespace, and a natural transparency of resource distribution cost awareness. These assets could be developed to a social name space.

Name space represents a topological solution to distributed location and retrieval. It facilitates reference, search, and discovery by the location association that informs retrieval with topological distance or proximity.

A distributed name space on an *ad hoc* topology (*i.e.* social trust peer) yields a topological delay. The retrieval connectivity of the social topology is nondeterministic, a traversal is necessary, while the retrieval connectivity of the host topology (*i.e.* IP+DNS) is deterministic, it has a relatively constant and uniform distance. Retrieval on the social topology has distance, while in comparison retrieval on the host topology has none. The performance of namespace retrieval on the host topology has a pass/fail proximity: a named location (*e.g.* URL) is dereferenced with a request which may fail. However, the deterministic failure is original. It is unrelated to the content object topology.

Generally, the traversal of a social topology is less efficient than the traversal of the technical optimisation. In detail, the performance of local namespace is higher, but the performance of remote namespace is lower and includes failure. Therefore, the character of social namespace is distinct from the character of a host namespace. The experience of utility is application dependent.

Review

The **theory of mechanical information** in simple space-time includes type theory and application.

The study of simple mechanical space-time has demonstrated the need to study the complex mechanical space-time that includes the topology of communication.

Therefore, any theory of mechanical information must include this complex space-time. If the extent of the universe of mechanical information is not fully enumerated, the confidence of theory is not satisfied.

Universe

The **mechanical information space-time** universe includes the simple space-time of the theory and application of data types, and the complex space-time derived from communication topology.

Future work

Developing this conception of mechanical information space-time.

Series

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https://docs.google.com/document/d/1q25w_Kp_waZcsAesLsOpYhT-qP_t4-w3SdGDdz-kSvg/edit?usp=drivesdk