Transactional Process Brokeraging of Virtual Commodity Assets
An Emergent Economic Ecology

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Abstract

Computational process nodes, interconnected as dynamic elements of process brokeraging functionality matrices, are becoming an integral part of a commodity asset delivery system which will, in essence, redefine indices of valuation, based on non-tangible, virtual assets, for which there has been no previous comparison in existing economic systems.

Many of the processes and technologies which are about to become the core elements of a new form of "virtual asset commodity economic system" are already becoming manifest, and thusly applied. An operational ecology is forming, indeed "evolving", consisting of an ever expanding arena of millions of processing and computational resource nodes, interconnected and operationally interdependent. The nodes themselves are functionally soft, as reconfigurable elements, which in this context, are bi-directional transceivers of "GelWare" encapsulated as functional identity and process templates within ubiquitously available, hierarchically interrelatable intelligent objects.

The advent of massively parallel, distributed processing systems, particularly as in the modality of an N-dimensional network of processing nodes (both real and virtual), referred to by some as ***"the fabric"*** (Eric and Linda VonSchweber, 1998, Computing's Next Wave) will become the operational ecology of the economic engines of the near future.

It is within this evolving socio-economic arena, where the primary elements of commoditized "virtual assets", and the integrated value chains of "process deliverables", become the primary economic drivers. In this context, indices of valuation are based not as much on the distribution of hard assets, such as materials and manufactured goods, as is common with most current economic systems, but rather are based on distribution of processes to which access is granted.

Keywords:
societies of artificial entities, synthetic intelligences, artificial lifeforms, complex metasystems, human / internet symbiosis, process brokeraging, agents, functionality matrices, reconfigurable computing systems, clusters, self-optimizing, self-modifying architectures

1 Introduction

We as a human species, are adapting, in rapid succession, to a series of evolutionary increments, contrived and accelerated by our own collective efforts, one of the outcomes of which is the "spawning" of synthetic intelligences, and their respective modes of communication, and our adaptation to an operational ecology with which even now we are symbiotically, and irreversibly connected.

Presented at this juncture, is the viewpoint that, as a process node embedded within the eventstream of our collective socio-economic and anthropological evolution, we begin by first creating various synthetic entities, as the interactive, analytical, and decision rendering components of an evermore complex electronic / telecommunications infrastructure upon which the economic engines of our current civilizations are required to rely.

This process dynamic in turn leads to the development and deployment of hierarchical, complex self-organizing, self-modifying societies of artificial entities, and their modalities of communication protocols, languaging schema, and tactical interactions. As this threshold of development is crossed, as an index of our collective human / internet symbiosis (Ostman, Internet as an Organism, 1996) becoming more pronounced, and irreversible, we begin to develop communication modalities which are quite "non-human" by nature, but are "socio-operative" norms of the near future.

Our collective development and deployment of complex metasystems of artificial entities and synthetic lifeforms, and acceptance of them as an integral component of the operational culture norm of the near future, is in fact the precursory developmental increment, as an enabling procedure, to gain effective communicative access to a contiguous collection of myriad *species* and entity types (synthetic and "real") functioning as ***process brokeraging agents***.

As marker points in the rapidly accelerating arenas of socio-economic and anthropological metasystems of development, several related projects are currently being pursued incorporating the utilization and "spawning" of intelligent agents and agent colonies, and related applications of artificial life and computational processes which mimic the physiologies of living organisms and systems to render the defacto equivalent of an "operational ecology" for advanced agents and distributed intelligences thriving in their respective synthetic environments.

In parallel with such activities, there is also a number of

development projects focussed on the creation of the next generation of "virtual humans", as per "smart avatars" which are the audio / visual front-end interactive interfaces for intelligent agent engines, and various applications which could benefit from such "psycho-ergonomic enhancement".
The result is the defacto equivalent of experiential tele-existence streaming as one of the process brokeraged commodities inherent in the operational ecology of synthetic environments, and the "entities" which reside in them (both virtual and real).

Reconfigurable processor & system components are a key element of this emergent ecology, both at the user side, consisting of "intelligent" bi-directional media / process brokeraging appliances, and at the other end of this value chain, the scalable, massively parallel computational / routing engines.

The term ***"GelWare"*** (Ostman, 1998, Telecommunications - Reconfigurable Computing Meets Telecom: Gelware and Beyond) is used to describe the core "element" of this operational ecology, in that the primary valuation embedded into this ecology is as much dependant on the reconfigurable functional identities of the components in the system as the actual system hardware components themselves. The functional identity modules are themselves *soft entities* which are brokeraged, as intelligent objects, serving as interdependent process templates.

Such templates are downloaded into a reconfigurable system component, the functional identity of which is perpetually in a potential state of flux until being temporarily redefined by the invocation of a requested, brokeraged process template.

Indeed, in this environment, in which intelligent objects are brokeraged and bi-directionally dispensed as requested, via a CORBA (Common Object Request Broker Architecture), or similar type of transactional environment, many thousands, if not millions of process nodes (virtual and real) are contiguously interconnected and dynamically available as a ubiquitous resource.

Processes which are thusly invoked in this environment are not merely confined to a specific application, as in a "software" task, but are also potentially capable of reconfiguring the functional and operational identity of any node which is available as a cooperative entity in this environment.

Hence, the definitional boundaries between "hard" and "soft" process elements in this operational ecology become diffuse, i.e., the term "GelWare". In this context, process modalities can brokeraged to or from any node to any other node or nodal cluster, as a bi-directional commodity, the valuation of which becomes manifest at the moment of inception of a particular process and functional identity template.

Potentially, an economic model emerges in which any individual's bi-directional media / process brokeraging appliance can either be utilized strictly as an access portal into this operational ecology, or as a bi-directional resource node, where the individual can allow their own personal computational capacity to become a "resource node", and receive compensatory value therefrom.

Furthermore, reconfigurable logic / process components lend themselves as very effective "platforms" for instigating computational processes which mimic the physiologies of living organisms and systems, particularly in the arenas of evolutionary and genetic algorithms. This is very relevant in the domain of self-organizing, self-optimizing routing systems, evolvable neural networks, and a plethora of related processes.

The synergistically interrelated combination of reconfigurable system components and routing interconnects eventually become the "spawning grounds" of meta-scale artificial lifeform systems, evolving as a collective of operational xenomorphs, flourishing in the defacto equivalent of an operational ecology to which we, the human species, develops a form of symbiosis.

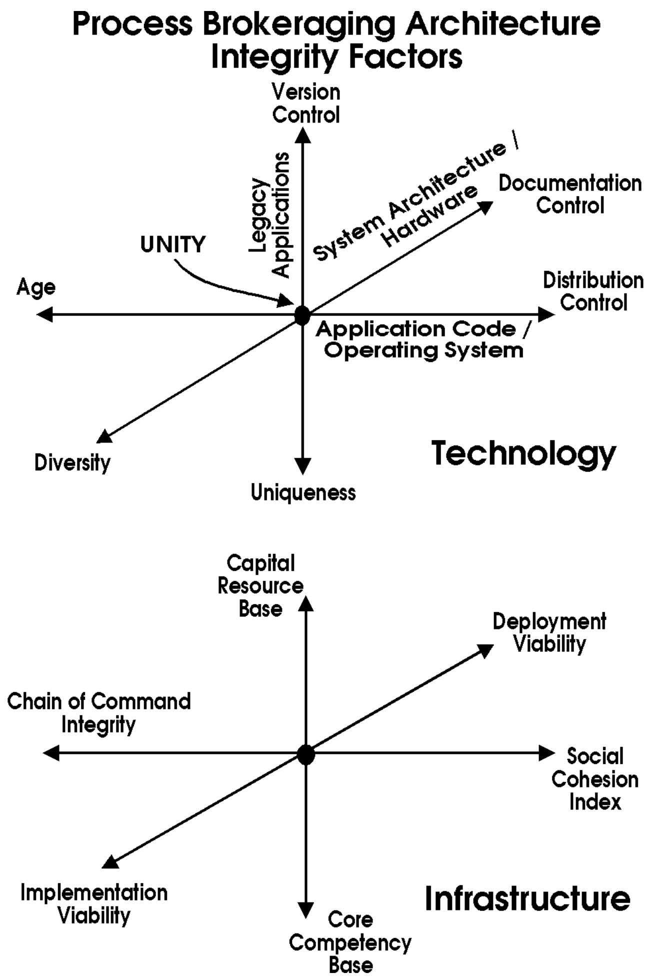


Fig. 1

2. Primary Elements of a Process Brokeraging Architecture System

2.1 Operational Requirements and Imperatives

Process brokeraging, as an operational paradigm for providing commoditized virtual assets as “process deliverables”, does require the development and maintenance of core elements upon which the overall system health is directly reliant.

Fig 1 indicates two specific domains upon which process brokeraging architecture integrity is directly reliant upon: technology, and infrastructure.

Each of these domains can be assessed in terms of three primary vectors, coordinate locations in which, as interpreted as a ratiometric measurement nodes, can provide a methodology for codifying a "relative integrity" value of a system status in transition.

As the transition toward a process brokeraging architecture driven economy is already a measurable phenomena in progress, existing core technologies upon which this system relies are themselves in a state of transition.

Legacy applications, operating as large to metascale data, knowledge, and process management systems, are juxtaposed upon a dichotomy in which IP (Intellectual Property) resource valuation is based on uniqueness, as per those developed and maintained by specific process commodity resource providers, and the ability to maintain and track version control over evermore complex system architectures. As these metascale systems continue to evolve, operational resource allocation and distribution strategies are transnational, indeed global, in scale, embedded into a combinatorial resource matrix of computational, storage, and communication interconnection resources comprised of "process nodes", both virtual and real, in which application version control becomes an extraordinarily challenging (and cost impacting) operational overhead load.

System architectures are similarly challenged, as they are juxtaposed upon a dichotomy between diversity, as in the ability to address ever expanding variations in perceived market needs, and documentation control, in which a ubiquitous set of standards and technical reference materials can be maintained, and are current at every node in this value chain.

Application code and operating systems, as the third vector plotted within the technology domain, are challenged by the dichotomy of age, and distribution control. This is a subtle, yet crucial operational imperative, in which the lifetime of viability between version increments of software and gelware modalities continue to shrink inward, but the complexity of maintaining consistency over outwardly expanding system architectures continues to increase.

The "perfect model" thusly applied would be represented as the unity nexus point, at the nodal cusp where all three vectors intersect. Though such a perfect model is only a theoretical norm, and not one which is actually possible, or even necessarily critical as a state of operations maintained in perpetuity in a contiguously transitory, and volatile environment, it does provide a theoretical condition set, as a focal point which should guide policy and operational imperatives.

Infrastructure integrity is represented by three primary vectors, which are actually subdivided into a dualistic "goal set" per each vector. Social cohesion indices, as defined by the measurement of how "well" a societal system can continue to operate in conditions which are increasingly complex, and order versus chaos ratiometrics are accelerating toward a chaotic state, are a direct byproduct of the chain of command integrity maintained throughout the system hierarchy. This chain of command itself may consist of entities both real (human) and synthetic (intelligent agents and "autonomous sentients"). Indeed, as system complexity increases, and the prevalence towards chaos becomes an artifact of even minimal operational capacity being maintained in such a realm, the inception of communities of agent entities for the maintenance of social cohesion index standards will become an absolute necessity.

Capital resource base, by traditional standards of measurement, would represent actual cash or implied currency resources within immediate access. More recently, however, implied currency resources have in fact become ever more ephemeral of a valuation index, based not upon actual available resources, but upon debt leveraged implied resources.

An emergent valuation system is becoming manifest, based upon the ***fiduciary carrying capacity*** of implied resource allocation, upon which the comparative reference points of relative valuation are in a perpetual state of flux. This forces, therefore, a valuation index based evermore prevalently upon the core competency base of the virtual assets, as in the ***process assets,*** of the system hierarchy.

The third, subdivided vector in the infrastructure integrity modeling schema is a viability quotient, established as a gradient between implementation, and deployment. Again, in a truly perfect (though impossible) model, these last two criteria would be perfectly matched, and always at maximum potential value at any given point in time.

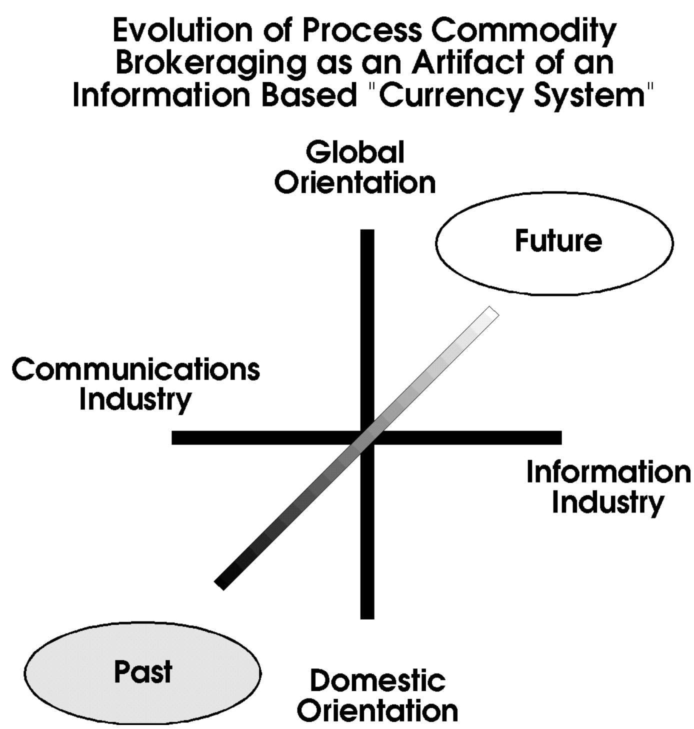


Fig 2.

2.2 Fiduciary Carrying Capacity of Information and Process Based Currency Systems

Fig 2 provides a visualization of major trend vectors, as an inter-relational interpretation of territorial orientation and industry transition mapped against time. At present, the nodal juncture cusp of the three indicated vectors is temporally at present, at the transitional threshold from the communications industries migrating toward the realm of information / knowledge / process industries, and the territorial orientation of such enterprises (and the economic system substrates thusly evolved) transitioning from domestic / regional to global, and ubiquitous in scale.

In this evolving ***economic ecology*** , new fiduciary instruments, the carrying capacity of which will be established by the implied valuation of the "virtual asset commodity" index of their inception, will evolve into a defacto form of operational currency.

Currency trading systems, and highly complex valuation idices based on evermore transitory, and volatile fluctuations in global intra-currency referencing calculations, often referred to as derivatives, are trending towards a realm of complexity and chaotic attributes which are challenging the very viability of current currency valuation systems. Currency has always been viewed as a form of "promissory note", whether implied by physical devices such as paper, or coin as static value transfer devices, or dynamic, as in "plastic", i.e., cards from which debentures or credit values could be issued on demand via an electronic transaction brokeraging process.

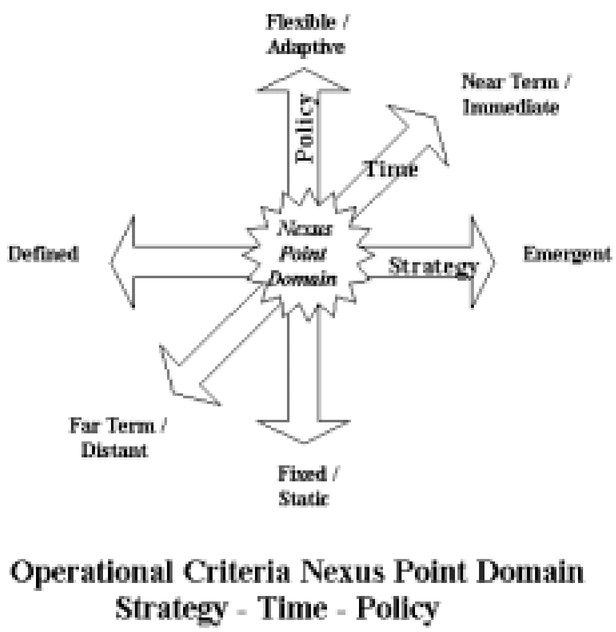


Fig 3

Mapped against this legally sanctioned methodology of implied value transfer, based upon the fiduciary carrying capacity of the instrument in question, has been the defacto implied valuation of commodity assets (virtual and real) upon which a momentary fiduciary carrying capacity could be referenced at a given moment in time. This momentary, temporally defined status of valuation, and therefore implied fiduciary carrying capacity of a commodity resource is usually referenced by it's trading potential, in what is now a global scale market environment in a near realtime negotiation environment.

2.3 Sovereign Knowledge Domains as a Virtual Commodity Asset Valuation Mechanism

A hybrid of this form of implied valuation indexing scheme is represented in the arena of information itself becoming a form of currency. Proprietary information resources, which are recognizable as the IP (intellectual property) resource base of any operational entity thriving in the economic eclogues of the current world, are often capitalized by the securing of such resources in the form of legally recognized "protection vessels", as in the form of patents, copyrights, and so on.

In the evermore transitory, ephemeral realm of emergent economic environments in which valuation indices are becoming dependant upon process access, as opposed to singularly dependant on distributed "hard asset" products, lifetime of information, and therefore, knowledge resources is also compressing into ever shrinking temporal domains. Traditional patenting procedures, which may often entail years of development and finalization before being granted to the petitioners of such, are now actually crossing a threshold in many instances where the timeline for implementation exceeds the actual lifetime before obsolescence factor of the potential products emanating therefrom. In that context, as the transition towards process brokeraging as commodity asset becomes manifest as a primary element in emergent economic ecologies, the relevancy of "traditional" patenting and related procedures becomes ever less relevant, transitioning toward a valuation indexing system based on ***sovereign knowledge domains.***

This trend toward establishing a criteria for a hybrid currency referencing system, is based not necessarily on the purportedly stationary valuation of static currency instruments, nor in the other extreme end of the spectrum of commodities which are in a perpetual state of momentary flux as an artifact of global trading activities on a moment to moment basis. IP resource, as an implied valuation vector of an economic entity, is not an openly tradable commodity, nor is a sanctioned form of currency with a (supposedly) fixed fiduciary carrying capacity . It does, however, represent the valuation potential of such an entity, particularly if capitalization of such an entity is based specifically on the interpreted valuation of the IP reosurce via the issuance of publicly tradable stock, the acquirement of investment capital, and so on. IP resource valuation, in this emergent realm, is no longer confined to the "protection vessels" or vehicles of containment represented by traditional means of patenting and copyrighting, but are trending toward the implementation of sovereign knowledge domains as a vehicle of valuation.

The fiduciary carrying capacity of such sovereign knowledge domains therefore implies the potential of a hybrid valuation vehicle, the implementation of which in itself would become a component embedded within the manifold of a process brokeraging architecture based economic system.

3. Operational Criteria and Indices of Valuation

3.1 Policy Imperatives – Strategy Implementation

Fig 3 suggests a methodology for plotting out a "nexus point" coordinate mapped against the vectors of strategy, time, and policy as would be primary indices of measurement for determining an operationally optimal domain within the framework of a virtual asset commodity based economic system, in which a process brokeraging architecture infrastructure was the environmental norm of such operations.

As an evidentiary precursor to such trends already established, and indeed accelerating toward this realm of virtual assets, process deliverables, and the various attendant subcomponents of such a realm, attempts have been made to compare such a transitional process as it is occurring in terms of the fundamental forces of the universe, as in time, space, and mass (Davis and Meyer, 1998). Within the duration of this transition period, a phenomena of turbulence will (and already is) enter into a stage of turbulence, becoming more extreme, as a form of a ***manifold of chaos*** during this transitional phase, before a series of variants based upon the process brokeraging / virtual asset commodity economic systems settle into a relatively stable operational norm.

As has been stated by the authors Davis and Meyer, "connectivity is eroding the pillars of the industrial era, destroying solutions that worked well for the unconnected industrial world. In its place is a new economic system based on intellectual capital and the law of increasing returns." The suggestion offered in their model is that the commodity of the highest value, based on inherent scarcity, is time. Time availability for the individual, the alliance entity, the corporate infrastructure which is in an ever accelerating state of change and internal reorganization.

Plotted against the vector of time in the chart provided here, in terms of event horizon of encounter and / or duration of processes thusly invoked in this environment, the timeline / duration index ranges from relatively longterm (weeks, months, years) to essentially immediate, approaching realtime, instantaneous reaction space, are the vectors of policy and strategy. Strategy, having at one time been almost exclusively confined to the domains of long term, pre-determinate logical constructs based on the longevity of a given policy of operational imperatives, is trending towards emergent, reactionary selections of potential response option matrices being invoked in a contiguously changing, if not volatile environment. Thus, the imperatives of policy are driven towards a status of being adaptive and flexible, almost xenomorphic by nature.

In this framework, the temporal domain continues to compress, and the complexity domain continues to expand, as is indicated by a process referred to here as the "convergence triad" (see Fig 4). The operational ecology of this emergent economic substrate system is physically manifest by the implementation of a global scale telecommunications infrastructure, and an ever increasing collection of computational resource nodes (virtual and real) bi-directionally interconnected to it, forming a form of infinitely scalable computing, and therefore, process brokeraging fabric.

The phenomena of convergence, as defined in this model, indicates that process velocity increases toward the threshold of instantaneous, realtime transactional process brokeraging, where the timeline between perceived need and acquisition of implied "product" becomes instantaneous, compressing into a domain of temporal singularity. Inherent with a process brokeraging architecture modeled economy is an increasing trend toward "synergistic co-dependency" between available resources, process nodes, and interrelationships between the organizational entities (ranging from individuals to metascale infrastructures) which need to interact with each other on a near realtime basis to maintain operational integrity. The general concept of JIT (Just in Time) strategies, and the technologies utilized in the current realm of JIT manufacturing, distribution, and transaction, will be pushed to an even greater extreme of operational carrying capacity, where processes are in a constant state of acquisition, fetched from a resource base comprised of mostly virtual asset commodities, and in a constant state of change as an adaptive, evolutionary process manifold driven by the requirements of immediacy, and extremely granular (highly individualized) "product" constructs and deliverables. Mesh granularity, in this model, refers to the coupling factor, proximity and integration of which between all nodes, as bi-directional transactional processing nodal coordinates in which product and process, offering and acquisition, and exchange of "fiduciary instruments" of implied value, based upon a medium of currency exchange, the indices of valuation of which are "tied" to a virtual asset commodity economic system.

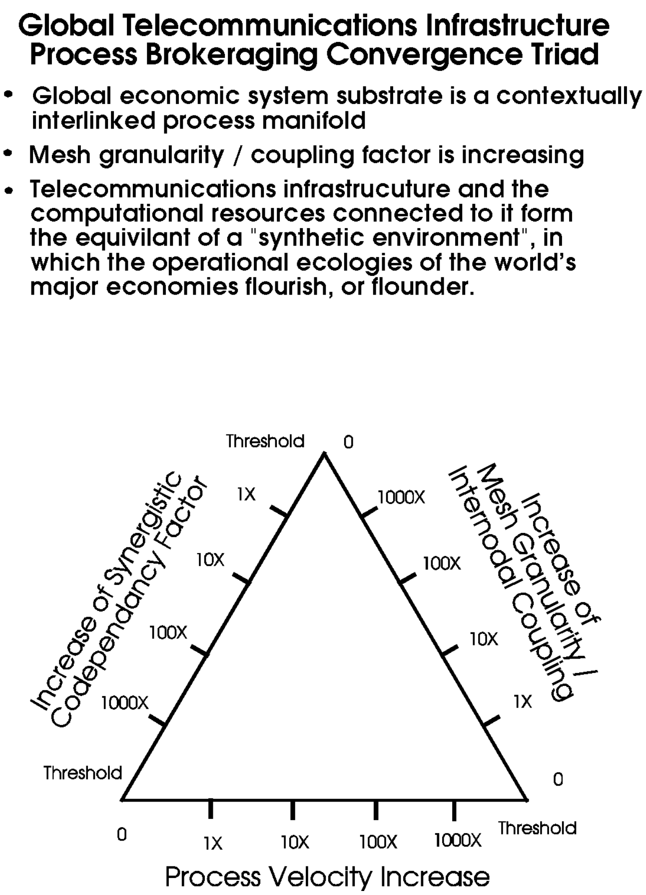


Fig 4

3.2 Process based commodities, "products", and elements of implied fiduciary value

Example “virtual commodity assets”, as would be primary elements of a valuation indexing reference matrix in a process brokeraging architecture based economic system:

- Information sets and sovereign knowledge domains
- Decision rendering and distributed intelligence assets
- Combinatorial processing resources and process matrices
- Intelligent autonomous agents and synthetic sentience
- Resource management and process routing modalities
- Predictive and adaptive analysis tools and applications
- Modeling, synthesis, and infomatics related processes

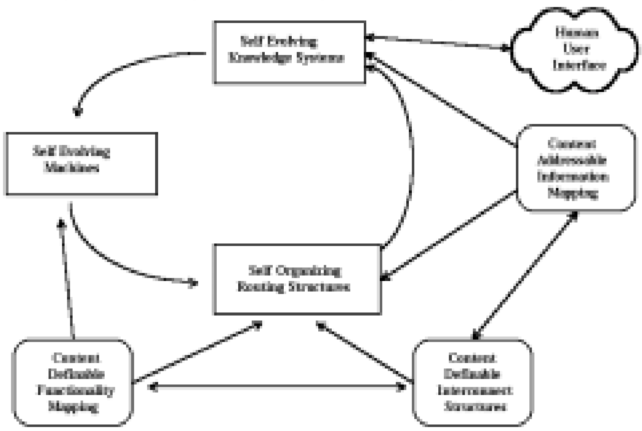


Fig 5

The flow chart indicated in figure 5 provides an overview of the process cycles and interdependent component domains of a process brokeraging architecture system, in which the primary commodities of value are synergistically interrelated with the “product commodities”, and the system itself. Human interaction, along with that of the intelligent agent entities which may be operating on their behalf, provide a contiguous event stream of input stimuli, which inherently shapes the knowledge topologies of self evolving knowledge systems. Self evolving machines, constructed from, or more accurately, ***spawned and evolved*** with computational algorithm modalities which mimic the physiologies of living systems, implemented on arrays of “soft” logic components, i.e., FPGA (field programmable gate array) and SPGA (system programmable gate array) elements, and populated with reconfigurable computational nodes and self-organizing routing interconnect sub-structures, are themselves affected by the contiguously modifying input stimuli streams, and conversely, provide a feedback path into the evolutionary dynamics of the self evolving knowledge domain thusly propagated.

In such a realm, content features within the transactional “process packets” circulated throughout the system are not merely valuated as commodities within a provider / consumer resource distribution system, but the system itself also is enhanced, and accordingly the components embedded within are in a continual state of evolutionary modification, as a dynamic feature set of the entire value chain. This factor adds a new dimension of valuation potential to such commodities, and indeed, at certain system level integration threshold, the commodities of “product”, “process”, and “system” become symbiotically inseparable, and in terms of valuation, homogenous.

3.3 Agent entities and hierarchical colonies as organizational organelles within the fabric ecology

The system “health”, or operational viability index, as a criteria for operational dexterity under difficult (if not relatively volatile, and unpredictable environmental fluctuations compressed into very short temporal domains), is dependant, at least in part, on the system’s capacity to adapt and evolve alternative functional response strategies, even at the expense of nodal entities (virtual and real) and agent entity populations.

The classic reference manual, “The Design of Intelligent Agents” (Jorg P. Muller, Springer-Verlag, 1996), provides a form of ecological, functional stratification model for a layering approach to multi-agent systems and their interrelational architectures. Though not an “exact match” for this implementation strategy, the overall hierarchical reference is a good model to examine for comparative reference. Cited are many examples throughout his text (recommended reading for anyone interested in delving into the domain of multi-agent system development history and trends), a particular infrastructure modality which does stand out as being specifically relevant here is the examination into “planning systems”, and accordingly, the “planning layer” of applied agent hierarchies.

This model provides a framework for establishing alternative agenting systems to be modeled upon, because the overall scheme is to devise strategic resolution alternatives to complex (and often, multi-threaded) process loops and “encountered phenomena” within a societal system of agent entities, as a methodology for extracting policy imperatives for future operations. Specific process layering and task allocation criteria serve as a general template upon which contiguously evolved, self-refining and optimizing models are established and “nurtured” for this particular implementation.

In this context, an enormous amount of work has been performed by a variety of development groups to resolve multi-agenting system architectures for two primary arenas of development:

1) Physical systems – the deployment of robots or robotic systems integrating sensor fusion, complex panoramic scene and sensory analysis, and assessment of a dynamic environment in which alternative reaction strategies need to be assessed, compared, and deployed (often with conditionalized knowledge threads extracted from accumulated “field exposure events” to modify adaptive knowledge base topologies)

2) Virtual systems – the deployment of “virtual” autonomous agents and agent colonies / hierarchies to seek out and consume experiential or “discovered” phenomena on a computing and / or telecommunications network, often for the purpose of organizing information sets and knowledge engineering applications, process negotiation and brokeraging purposes, or in optimizing operational complexity loads encountered during high throughput, massively parallel information or process management scenarios (the latter two are currently particularly prevalent in arenas such as financial market analysis and trading systems, risk assessment and modeling, complex systems modeling and control policy implementation, and a variety of strategic and tactical response related procedures).

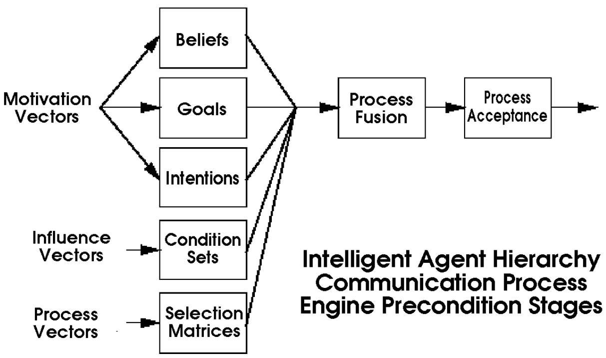


Fig 6

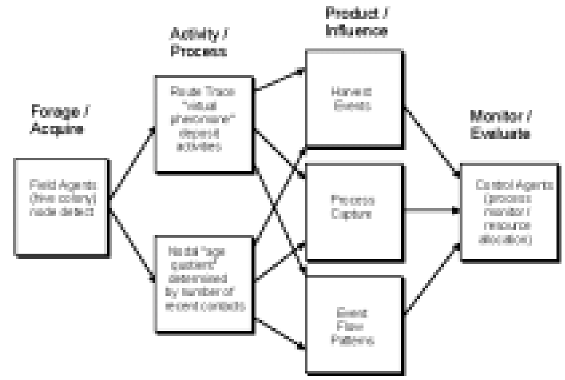
As an example "node" of a computational, bi-directional process brokeraging resource fabric, figure 6 implies an agent hierarchy communication process modality, at the communications precondition reconditioning stages level within that hierarchy.

A subtle, yet important feature of the emergent economic model based on a ***fabric resource ecology*** all nodes at least possess the option of brokeraging commodity resources to all other nodes within the system, in which case, autonomous agent entities will be increasingly relied upon for the task(s) of evaluation, selection, and comparative referencing (bargaining, in human terms) for commodity valuation and "acceptance" of transactional criteria.

The human participants in this arena themselves are also, therefore, allowed the option of providing value, and therefore commoditizing, whatever computational or process resource capacity they themselves, or their brokeraging agent representatives, may wish to provide as a bi-directional resource node within the fabric.

3.4 Example of a virtual asset commodity resource from a "fabric" resource ecology, populated with a hierarchical agent colonies / subspecies systems

Figure 8 indicates an operational resource, output product, and goal implementation reference matrix, adapted to provide, in this example, the ultimate goal objective of an optimized near realtime nodal interconnect routing architecture implementation on a wide spectrum tactical wireless network.



First layer agent entity (hive colony member) supplying next increment agent entity (control agent), from which future control influence and process mechanisms can be established, in successive layering agent hierarchy

Fig 7

The above stated "ultimate goal" to be extracted from this example utilizes a layered approach to the deployment of definable "agent species" types, in the following categories arranged in order of entity complexity (simple to complex), temporal domain "reaction space" (near realtime implementation to longterm policy directive), and process domain (operational to evolutionary):

1) Hivelike Colony Agents
2) Control Agents
3) Brokeraging Agents
4) Planning Agents

A series of vectors can be charted through this matrix, orthagonally or diagonally, to extrapolate a relative operational "nexus point" within an XYZ coordinate chart (see Fig 3), that can be assigned a relative quotient value as an approximation of strategy / time / policy influence or process factorials per each increment along these vector plots.

The purpose of this assessment is to provide a relatively quick "charting method" for picking out key operational criteria in determining the system behavioral attributes, in which the "front line" operations (seek and acquire communication nodes) are relatively near realtime, performed by "simple", expendable hive agents with almost no intelligence, and very "primal" motivational instincts.

At the other extreme of this domain are highly complex (planning) agents, which are longterm, (potentially infinite lifetime) entities, who are highly evolved over n-iterations of "relative existence" within an ***operational ecology,*** in which the overall ecological system viability is most dependant upon the "experiential knowledge" harvested from the front line hive agents, and conditionalized through the intermediate successive layers of agent entities – in this case, two additional layers consisting of control agents, and brokeraging agents.

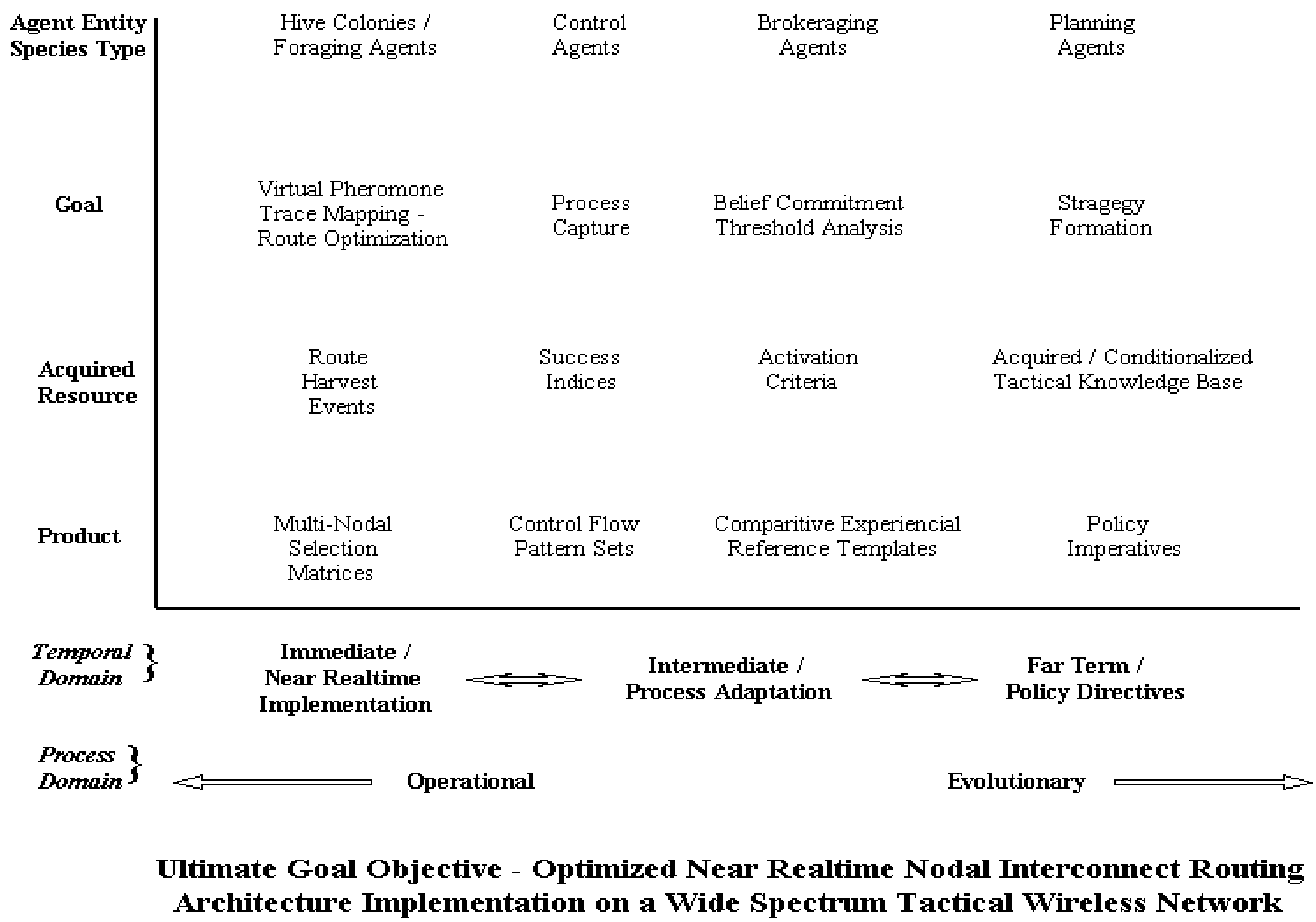


Fig 8

3.5 Example system strategy and operational goals:

1) The shortterm goals of this system are to yield extremely rapid detection and acquisition of a wide variety of nodal resources, and "mark them" with virtual pheromones which are the source coordinates for a tracing routine which a very large (and highly expendable) population base of a hive community can become collectively aware of, and inform the next "layer" of agents as an artifact of their activities
2) The midterm goals are to extract recognizable environmental feature sets, nodal variants as may be "cumulatively relevant" in such an operational ecology, and capture emergent behaviors demonstrated by the hive agents during their activities.
3) The longterm goals of the system are to establish an evolutionary eventstream of observed and behavioral phenomena, which provide influence (and potentially mutational) vectors implemented upon the preceding layers of agent entities, in this model, consisting of control and brokeraging agents, by the planning agents, which themselves are specifically evolutionary, and "infinite lifetime" duration by nature
4) The system goals, as an operational ecology, are thusly subdivided:
   A) Provide the most robust, extremely fast, wide spectrum multinodal, mission critical wireless routing system that currently available or nearterm developable technologies are able to provide
   B) Harvest the acquired "experiential knowledge" gathered during successive iterations of system operations to create a highly adaptive, contiguously evolving (and by implication, improving) system architecture.
   C) Discover emergent behaviors and "operational ecology" characteristics which may not be available by other means, from which evermore robust, anticipatory analysis modeling and tactical response (and therefore, policy imperatives) can be derived and established for future developments in this application domain

An abbreviated schema (see figure 7) of the major components and implied process dynamics of first layer hive agents "feeding" the second layer of this type of hierarchical, multilayered system architecture reveals a basic "roadmap" of the activities, processes, products, and goals of the agents thusly embedded in this system. The foraging activities of the "hive agents" provides more than merely a dynamic data stream for routing optimization – it also "fuels" and influences the successive layers of an evolvable system architecture.

Conclusions

The potential for multiple variants of the core themes thusly represented in this paper are numerous, of course. However, the general overriding thesis here is to establish a series of criteria in which future economic systems, as they are currently evolving, will become ever more reliant upon a commodity valuation indexing protocols based upon virtual assets and process brokeraging, that the timelines and velocity quotients associated with such an economic engine and the transactional activities conducted therein will be essentially instantaneous, and strategy and policy imperatives, indeed operational modalities at all layers and levels of this emergent operational ecology, will be infused with myriad colonies and species types of autonomous agents and synthetic lifeform entities. Furthermore, the transitional "state boundaries" between hardware and software, "real" and virtual lifeforms interacting in a homogenous economic ecology, will become indistinguishable and irrelevant, in a ubiquitous domain of bi-directionally distributed "process access" deliverables.

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