

Negotiating Order with Generative Pattern Language: A workshop at PLoP 2017

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This workshop for PLoP 2017 explores generative pattern language from two alternative frames of reference: (i) *Creating Order Of* (especially in physical geometric structures) and (ii) *Negotiating Order With* (especially in non-material interactive processes).

While *Creating Order Of* comes derives from Christopher Alexander's research into the *Nature of Order*, *Negotiating Order With* derives primarily from Anselm Strauss' research into social order. The duality between these two frames can be illustrated with the 1985 Eishin project as an example.

Frames of reference originate in the appreciation of assumptions associated with paradigms, in organizational systems research. A duality of (i) *Creating Order Of*, with (ii) *Negotiating Order With*, is proposed as complementary frames of reference.

This duality can be appreciated as already unfolded in agile practices associating with initiating, constructing and transitioning information systems. This duality may be further explored in other domains.

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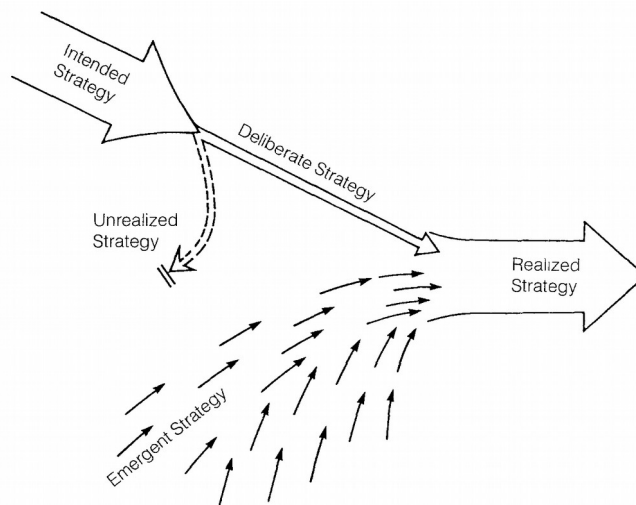
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1. INTRODUCTION



From a perspective of human systems, order is established as the result of the deliberate and the emergent. In strategic management research, "strategy as pattern" is one of five definitions, depicted in Figure 1: "strategy is a pattern – specifically, a pattern in a stream of actions" (Mintzberg 1987, 11).

If the distinction made between *intended* action (plans) and *realized* behaviour, alternative streams may be encountered on the journey: *deliberate* action follows the intended plan, whereas *unrealized* plans follow from inaction or misguided execution; *emergent* action may result either from or despite preconceived intentions.

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The theoretical foundations of generative pattern language, in the life work of Christopher Alexander, are explicated in his publication of *The Nature of Order* (Alexander 2002, 2004), a scientific introduction related to complexity theory (Alexander 2003), and empirical findings on the theory (Alexander 2007). These works follow a deductive approach to science. An alternative approach to science, as theory-building for generative pattern language, is to follow an inductive method (Langley 1999; Carlile and Christensen 2005). The history of the 1985 Eishin project can serve as a case study towards which emerging theory can be constructed (Alexander 2012).

A benefit of appreciating both deductive and inductive approaches to science is the possibility of *sweeping in* new knowledge, through a more rigorous definition of the inquiring system (Churchman 1971; Mitroff and Linstone 1993). While the school following Christopher Alexander centers on organizing physical geometric structures, a school following Anselm Strauss centers on organizing non-material interactive processes (Strauss 1978; Nathan and Mitroff 1991; Parhankangas et al. 2005). Continuing work aligned with the theories and philosophies of these schools follow alternative frames of reference (Shrivastava and Mitroff 1984).

Practically, practitioners exercising agile practices in the initiation, construction and transition of information systems implicitly and explicitly have been informed by (i) *Creating Order Of*; and (ii) *Negotiating Order With*. Less mature domains, such as Service Systems Thinking, may similarly be informed by dual frames of reference.

The workshop at PLoP 2017 presents an opportunity for practitioners in the pattern language community to explore these ideas, suggest alternative tacts, and potentially inform the theory-in-practice in everyday work. Sections 2 and 3, below, are largely conception exposition that describes the thinking to date on the workshop. Sections 4 and 5 below have largely been left open to take the direction that seems natural to the workshop participants. Assessments and findings from the workshop should be published in a subsequent manuscript.

2. WHAT DO (I) *CREATING ORDER OF*, AND (II) *NEGOTIATING ORDER WITH*, MEAN?

The two frames – of *Creating Order Of*, and *Negotiating Order With* – have histories: the former has been associated primarily with the domains of built physical environments, while the latter is associated with sociological organization of work.

2.1 *Creating Order Of* Originates From Organizing Physical Geometric Structures

Christopher Alexander is a builder, and a cofounder of the Center for Environmental Structure at the University of California at Berkeley. His concern for order is on creating physical buildings.

The activity we call building creates the physical order of the world, constantly, unendingly, day after day. [...] Our world is dominated by the order we create.

[...] Our present idea of "order" is obscure. [...]

In physics and biology some progress has been made toward understanding the phenomenon of order, and the processes which create order. The creation of living organisms through the morphogenetic process, the creation of matter, the creation of stars and galaxies from nuclear fire, the constant creation by particles by interaction with one another – have been studied in the last seventy years. In these limited cases we now have a rudimentary idea of the way the order-creation works. [...]

... I shall argue, the process of building is an order-creating process of no less importance that those of physics and biology. (Alexander 2002, 10:1).

Thus, for an architect in a built physical environment, the domain calls for *Creating Order Of* geometric structure.

[When] I really ask myself "what *is* order" – in the sense of deep geometric reality, deep enough so that I can use it, and so that it is able to help me create life in a building – then it turns out that this "order" is very difficult to define.

[...] Perhaps one of the clearest statements so far has been expressed by the physicist David Bohm. Bohm tried to outline a possible theory in which order types of many levels exist and are built of hierarchies of progressively more complex order types.

But *none* of this, suggestive as it all is, is directly useful to a builder (Alexander 2002, 10:10).

In "a new vision of architecture", Alexander seeks:

... a post-Cartesian and non-mechanistic idea of what kinds of statements can be true, *a theory in which statements about relative degree of harmony, or life, or wholeness – basic aspects of order – are understood as potentially true or false*. This means we shall have a view of the world in which the relative degree of life of different wholes is a commonplace and crucial way of talking about things (Alexander 2002, 10:22).

In 2007, Alexander reported on empirical findings from *The Nature of Order* (Alexander 2007). Of the 13 arguments in Book 1, *The Phenomenon of Life*, 7 are listed as "demonstrated", and 1 as "at least strongly indicated". Of the 10 arguments in Book 2, *The Process of Creating Life*, 6 are listed as "demonstrated", (with a note that the term "structure-preserving transformation" had been superseded with the more expressive term "wholeness-extending"). Of the 11 arguments in Book 3, *A Vision of a Living World*, 5 are listed as "demonstrated", 1 as widely demonstrated, and 1 as "partially verified, but certainly not yet truly demonstrated". Of the 22 arguments of Book 4, *The Luminous Ground*, 6 are listed as "demonstrated".

Beyond built physical environments, Christopher Alexander was encouraged by the use of pattern language in other domains, but did not go as far as speaking to their efficacy.

We were always looking for the capacity of a pattern language to generate coherence, and that was the most vital test used, again and again, during the process of creating a language. The language was always seen as a whole. We were looking for the extent to which, as a whole, a pattern language would produce a coherent entity.

Have you done that in software pattern theory? Have you asked whether a particular system of patterns, taken as a system, will generate a coherent computer program? If so, I have not yet heard about that. But, the point is, that is what we were looking for all the time. Again, I have no idea to what extent that is true for you and whether you are looking for the same thing when you work on software patterns (Alexander 1999, 75).

As a scientist, Alexander has been clear on the scope of his work. He is an architect and builder working in domains where *Creating Order Of* geometric physical space is the primary concern.

2.2 *Negotiating Order With* Originates From Organizing Non-material Interactive Processes

In human relations, the seminal work on social order by Anselm Strauss focused on change in institutions, organizations and social worlds.

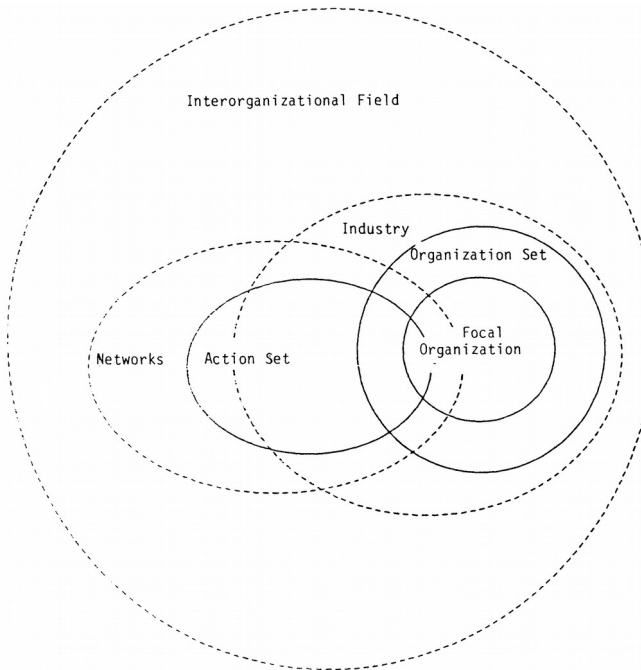
There is always order; the world never does go completely to pieces, except perhaps briefly in total mass panics. Even in panics, however, complete disintegration is an illusion because in theater fire panics the mad rush is toward the exits and not to anywhere else; likewise when persons or families flee invading armies they some act irrationally but others act with full rationality. Such breakdowns as occur during periods of social disintegration consequently provide changed conditions that bear on subsequent actions, whether actors perceive this clearly or not. Ordering is ongoing (Strauss 1993, 261).

Based on the study of personnel and patients in two psychiatric hospitals in the 1960s, Strauss and his collaborators coined the term *negotiated order*. In a subsequently published book, the main points were emphasized.

1. We stated that social order was negotiated order: in the organizations studied, apparently there could be no organizational relationships without accompanying negotiations.
2. Specific negotiations seemed contingent on specific structural conditions: who negotiated with whom, when, and about what. So the negotiations were patterned, not accidental. They could be studied in terms of their conditions, character, and consequences for persons and organizations.
3. The products of negotiation (contracts, understandings, agreements, "rules," and so forth) all had temporal limits, for eventually they would be reviewed, reevaluated, revised, revoked, or renewed.
4. Negotiated order had to be worked at, and the bases of concerted action needed to be continually reconstituted. Not only were negotiations continually terminated, but new ones were also made daily.
5. The negotiated order on any given day could be conceived of as the sum total of the organization's rules and policies, along with whatever agreements, understandings, pacts, contracts, and other working arrangements currently obtained. These include agreements at every level of the organization, of every clique and coalition, and include covert as well as overt agreements.
6. Any changes impinging on the negotiated order – whether something ordinary, such as a new staff member, a disrupting event, or a betrayed contract, or whether more unusual, such as the introduction of a new technological element or a new ideology – called for renegotiation or reappraisal. This meant consequent changes in the negotiated order.
7. We went on to suggest that the reconstitution of social or organizational order (which was our central concern) might be fruitfully conceived of in terms of a complex relationship between the daily negotiation process and a periodic appraisal process. The form not only allowed the daily work to get done but also reacted on the more formalized and permanent organizational rules, policies, and established conventions and understandings. In turn, the latter served to set the limits and some directions of negotiation.

8. We suggested, finally, that future studies of the complex relationships that exist between the more stable elements of organizational order and the more fleeting working arrangements might profit by examining the former as if they were sometimes a background, against which the latter were being evolved in the foreground, and sometimes as if the reverse obtained. What was needed was both a concentrated focus on and the development of a terminology adequate to handle this kind of background-foreground metaphor. But, whether that metaphor or another, the central question was "How do negotiation and appraisal play into each other and into the rules, policies and other 'more stable' elements of social order?" (Strauss 1978, 5-6).

In the 1978 book, there was further development of actors' theories of negotiation, negotiation subprocesses, and specifications of conditions and consequences associated with those subprocesses. In later work, a new concept of processual ordering, for which negotiated order would be one of the interactional processes contributing to social order (Strauss 1993, 255).



Negotiated order has been extended from interpersonal studies as a tool for the analysis and development of interorganizational fields (Nathan and Mitroff 1991). In Figure 2, the levels of the interorganizational field include (i) the focal organization as the fundamental unit of analysis, (ii) the organization set with others having direct, ongoing task-related links to the focal organization, and (iii) action set of those that convene on a temporary basis to solve a shared problem. The (iv) networks are not centered on a single focal group, and has links both potential and actual, and both direct and indirect. The (v) industry includes organizations that share similar functional objectives. The (vi) interorganizational field (or problem domain) encompasses all involved in a particular problem, including the news media and government offices. A

negotiated order may develop through deliberate planning, with or without emergent actions, and/or from informal interactions amongst organizations.

With the rise of dynamic, knowledge-based businesses in the 21st century, negotiated order is positioned as a more fluid alternative to the inherently rigid internally consistent set of rules essential to legal order (Parhankangas et al. 2005). Turning towards negotiated order enables more rapid adaption in turbulent fields. In commercial software development, the open source approach of the Linux community enables (i) ambiguous paths and priorities; (ii) decentralized authority; (iii) monetary and non-monetary forms of capital exchange; and (iv) co-producer roles. Features of negotiated order also show up in other business systems, e.g. home furnishings manufacturing, encyclopedia publishing, and outdoor sporting gear and apparel retailing.

Negotiating Order With applies to non-material interactive processes. Social relations involve interactions between human beings with independent will, who may not respond predictably to prior programming. Socio-technical information systems not only deals with intelligence, but potentially disinformation and misunderstanding. Negotiating order may be an interaction with an inanimate thing (e.g. negotiating a curve in the road), or with a sentient being (e.g. a child in a temper tantrum). Failing to negotiate with the non-rational may lead to having to deal with the irrational (Hawk 1996).

2.3 Hints of *Creating Order Of*, and *Negotiating Order With*, Appear in Complementary Work

Prior work with pattern language has implicitly included both structural (artifactual) and processual (temporal) perspectives. In Christopher Alexander's work, *A Pattern Language* aligns more with *Creating Order Of*, while *The Timeless Way of Building* aligns more with *Negotiating Order With*. *The Oregon Experiment* and *The Battle for Life and Beauty on the Earth* put both perspectives jointly into practice.

A configurable development process based on pattern language became a standard approach in much of IBM Global Services in the late 1990s (Cameron 2002). An engagement model followed a modular approach not only for (i) *Creating Order Of* the artifacts produced by teams of specialist groups, but also for (ii) *Negotiating Order With* downstream teams who would integrate their work. The former was supported through *Work Product Descriptions* of the subject matter to be produced, and *Technique Papers* used for detailed guidance on building a work product. The latter was supported by *Work Breakdown Structures* as skeleton plans of major and minor checkpoints each with exit criteria, and *Role Descriptions* of the specialists sets of skills expected to perform the work. Much of this pattern language thinking evolved into the Open Unified Process contributed to the Eclipse Foundation (Balduino 2007).

A project language has been defined as "a pattern language with the special purpose for realizing a concrete project" (Motohashi, Hanyuda, and Nakano 2013, 3). A pattern language orients more towards *Creating Order Of*, for typical and common situations describing an approximate solution. A project language orients more towards *Negotiating Order For*, within the experiences and culture of a local community.

3. HOW DO THE FRAMES OF REFERENCE OPERATE AS A DUAL?

As a way of making the frames more concrete, the 1985 Eishin project is a practice-oriented description in which theories are brought to bear. Abridging the book into a brief, the practices employed can be traced with 8 activities (Ing 2015, 12-32)

Interview on hopes and dreams

1. Make a "poetic vision" as first sketch of a pattern language
2. Make the rudimentary pattern language physically coherent
3. Refine the language through discussions
4. Obtain approval of the pattern language
5. Renegotiate pattern language with space and money within budget
6. Find systems of centers in (i) the pattern language, and (ii) the places in the land. Combine them.

7. Adjust the site plan on the site itself (not on models)

We'll return to these activities after a brief diversion into explaining Frames of Reference.

3.1 Frames of Reference Try To Match Types Of Theories With Types Of Ideologies

Frames of Reference underlie assumption differences that characterize knowledge creation and knowledge utilization activities across groups.

The concept of a FOR [Frame of Reference] refers to a fundamental core of assumptions that form the basis for other assumptions and jointly underlie all human inquiry – scientific and nonscientific, formal and informal FORs include the epistemological, methodological, scientific, and common sense assumptions that an individual or a group of individuals make about the conditions for gaining valid information and for utilizing it. FORs provide the conceptual schemes, models, or theories and cognitive maps that the inquirer uses to order all information and to make sense of it ... (Shrivastava and Mitroff 1984, 19).

The six general elements that constitute a FOR include:

1. *Cognitive elements* ... "constitute the most basic units of a person's belief system. They include, among other things, cognitive categories and bits of data that are taken for granted or regarded as so basic that they are beyond doubt. These primitive cognitive elements may be regarded as the fundamental units of information that support a person's inquiring system or concept of the world".
2. *Cognitive operators* ... "refer to the methods by which individuals order and rearrange and make meaning out of large amounts of data. Cognitive operators include classification schemes, models, analytical devices, and common sense theories with which individuals approach inquiry".
3. *Reality tests* ... "guarantee or validate the "realness" of cognitive elements, cognitive operators, and knowledge or information itself. They validate knowledge and process of inquiry by expressing symbolically their legitimating connection with critical, shared, social, and cultural experiences. Collective social and cultural experiences form the basis of these reality tests".
4. *Domain of inquiry* ... "refers not to the limits of a specific instance of inquiry, but to the limits on the entire set of cognitive maps that individuals use in inquiry in generation. The breadth of inquiry is a function of individuals' knowledge base and their appreciation of alternative reference frames, that is, their reflexivity in inquiry".
5. *Degree of articulation* ... "refers to the degree to which the assumption in the other four elements have been articulated and codified. It also reflects the degree to which the individual's FOR will be and can be shared by others".
6. *Metaphors* ... "embedded in the language and jargon used by individuals ... permit the symbolical reconstruction of the organizational world in meaningful ways. They go beyond being mere embellishments of language by stimulating the understanding of assumptions through a creative process of comparison and crossing of images They describe unnameable characteristics of an individual's FOR by drawing implicit analogies with known objects and experiences, thereby explicating and clarifying obscure and nebulous aspects of FOR" (Shrivastava and Mitroff 1984, 20–23).

In Table 1 is a straw man description trying to make sense of differences and complements between *Creating Order Of*, and *Negotiating Order With*.

Table 1: Frames of Reference – Creating Order Of, and Negotiating Order With

<i>Element of Frame of Reference</i>	<i>Creating Order Of – Frame of Reference</i>	<i>Negotiating Order With – Frame of Reference</i>
1. Cognitive elements	Primacy for a kit of parts, each pattern as a rule which describes what you have to do to generate the entity which it defines. Intellectual commitment towards wholeness, beauty and/or quality-without-a-name in a common pattern language across a group or a community.	Primacy for engagement with constituents, and adjusting plans situated in reality rather than modeled. Intellectual commitment to piecemeal growth, sequencing from broad primary features down through detailed secondary features.
2. Cognitive operators	Synthesizing form as assembling patterns from a semi-lattice structure toward generating a coherent whole. Converging on a collective subjective judgement that one configuration is superior to another (e.g. Turkish carpets)	Reviewing and adjusting pattern language with the wide variety of stakeholders, towards explicit approval. Fitting centers on the faster pacing layers (e.g. the buildings) on the slower pacing layers (e.g. the land)
3. Reality tests	Materially (hard) empirically observable and experimentally verifiable proofs. Superiority as consensus amongst experts.	Non-materially (soft) pragmatic value, liveability, maintainability over time. Enjoyment by beneficiaries / occupants / users.
4. Domain of Inquiry	Ranges of contexts where experiences with desirable features have proven historically successful and replicable.	Situated conditions on which the work is platformed, priorities and preferences of the specific client.
5. Degree of Articulation	High explicit articulation of a pattern language that forms rules for design, construction and maintenance. Low implicit articulation of pattern language methods, transmission through apprenticeship	Low implicit articulation of criteria for evaluation, client can refine preferences as appreciation deepens. High explicit articulation of desirable organizational and individual practices in iterative and/or cyclical procedures.
6. Metaphors	Timeless way, holism, aesthetics.	Living system, harmony, sequences.

These frames of reference, as a duality, form a creative tension in the development and use of pattern languages in general.

3.2 Creating Order Of and Negotiating Order Can Be Dual Frames of Reference

In Table 2 is a straw man description attempting to highly differences between Creating Order Of, and Negotiating Order With, on the activities of the 1985 Eishin project.

Table 2: 1985 Eishin Project – Creating Order Of, Negotiating Order With

<i>Activities</i>	<i>Creating Order Of – Frame of Reference</i>	<i>Negotiating Order With – Frame of Reference</i>
1. Interview on hopes and dreams	Rough pattern language draft text of site placement and buildings	Engagement interviewing students, teachers, administrators
2. Make a “poetic vision” as first sketch of a pattern language	Preliminary architectural text of campus precincts, streets, yard, great hall, buildings, lawn	Meaning and expressions of intent conveyed by teachers, staff and students
3. Make the rudimentary pattern language physically coherent	Not-to-scale drawing of patterns, with seven principles ensuring completeness of the language	Visual representation reflecting inclusion of features from the dreams of interviewees
4. Refine the language through discussions	Refinement and further detailing of the pattern language text	Discussions with constituents confirming concerns have been addressed
5. Obtain approval of the pattern language	Eight key centers, 110 patterns	Acceptance that architects have appreciated concerns and interests
6. Renegotiate pattern language with space and money within budget	Trimmed estimate of (i) indoor built space, and (ii) outdoor coverage of land, within the constraints of physical boundaries and financial constraints	Participation in reallocation of spaces to conform to available resources, through tradeoff decisions (only increasing trimmed totals when decreasing elsewhere).
7. Find systems of centers in (i) the pattern language, and (ii) the places in the land. Combine them.	Geometric configuration of centers of the pattern language into a feasible, coherent whole.	Realities of the land (e.g. ridge and swamp) with abstractions of buildings yet to be constructed.
8. Adjust the site plan on the site itself (not on models)	Surrogate visualizations (e.g. marks, flags) on the land to confirm pattern language	Progressive refinement of the pattern language into a physical reality

Roughly, *Creating Order Of* is more concerned with (hard) objective material artifacts, whereas *Negotiating Order With* is more concerned with (soft) interactive non-material engagements.

4. HOW HAS THE DUALITY UNFOLDED IN THE DOMAIN OF INFORMATION SYSTEMS?

Beyond built physical environments, pattern language has influenced not only the thinking about architecture in software, but also agile management and development processes (e.g. Scrum and Extreme Programming).

As an exercise, Table 3 is a template outlining the activities of three phases of Disciplined Agile Delivery for consideration in the two frames of reference (Ambler and Lines 2012).

Table 3: Disciplined Agile Delivery – Creating Order Of, Negotiating Order With

<i>Phase</i>	<i>Activities</i>	<i>Creating Order Of - Frame of Reference</i>	<i>Negotiating Order With - Frame of Reference</i>
Inception Phase	1. Identifying a Project Vision	?	?
	2. Identifying the Initial Scope	?	?
	3. Identifying an Initial Technical Strategy	?	?
	4. Initial Release Planning	?	?
	5. Forming the Work Environment	?	?
Construction Phase	6. Initiating a Construction Iteration	?	?
	7. A Typical Day of Construction	?	?
	8. Concluding a Construction Iteration	?	?
Transition Phase	9. Collaborating to Deploy the Solution	?	?

Other agile approaches could be similarly analyzed. Progress on discussing this straw man during the workshop will be subsequently reported.

5. HOW MIGHT THE DUALITY UNFOLD IN OTHER DOMAINS?

In the event that the workshop advances rapidly through the content in the first four sections, we may have the opportunity to think about the frames of reference in domains that are less mature.

Table 4 is a template for Service Systems Thinking, which was first presented at PLoP in 2014 (Ing 2014).

Table 4: Service Systems Thinking – Creating Order Of, Negotiating Order With

<i>Activities</i>	<i>Creating Order Of - Frame of Reference</i>	<i>Negotiating Order With - Frame of Reference</i>
1. ?	?	?
2. ?	?	?
3. ?	?	?
4. ?	?	?
5. ?	?	?
6. ?	?	?
7. ?	?	?
8. ?	?	?

Perhaps some other domains might be suggested by workshop participants.

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