



Doug McDavid

Consultant and mentor in architecture of enterprise

EA and Requisite Variety

December 2, 2015 • 26 Likes • 21 Comments

Requisite Variety – It's not just a good idea, it's the law!

The “Law Of Requisite Variety” is arguably one of the most important, if not THE most, important and useful of all the principles and considerations for the profession of Enterprise Architecture. As formulated by Ross Ashby (British cyberneticist and psychiatrist), the law reads: “Only variety destroys variety.” Stuart Umpleby offers a helpful elaboration of Ashby's rather terse and mysterious formula: “Only variety (in a regulator) can destroy variety (in the system being regulated)”

If you're encountering this concept for the first time, I can imagine that you're thinking, “Well, hang on. Why would anyone want to destroy variety? I should think that variety is a GOOD thing!” And you'd be right, of course, in the sense that much of enterprise is designed for the pursuit of novelty and innovation that dazzles the eye and delights the customer.

But in this case, we need to keep in mind that an effective form of control is absolutely essential for a business or other enterprise to remain viable. Norbert Wiener's seminal book was entitled *Cybernetics: Or, Control & Communication in the Animal and the Machine*. Maybe a bit clearer statement might be: “the variety in the control system must be equal to or larger than the variety of the perturbations in order to achieve control”

That points directly at the issue: perturbations. Disturbances. Disruptive and destructive events that sap the energy and thwart the best-laid plans of the enterprise. Here is an example of a perturbation that is NOT met by the requisite capability of a control system: <https://www.youtube.com/watch?v=8s3UogfAGgo>

A household thermostat provides a simple example of a control system that we can all relate to. This is a control system that is controlling two states of room temperature – too hot and too cold. When the room temperature exceeds the desired level, the control mechanism (thermostat) activates a cooling mechanism (air conditioner) to reduce room temperature to the desired level. When the room temperature falls below the desired level, the control mechanism activates a heating mechanism (furnace) to increase room temperature to the desired level. Notice, in passing, that it's futile to have a control mechanism with the requi-

site variety of states we want to control, if it is not connected to the ability to effect the desired changes. Notice also, that having just said that, we find that we find ourselves talking about architectural elements, or components – sensors, controllers, effectors, etc.

So, what does this mean for enterprise architecture?

The point I want to make here is that a practical emphasis should focus, not on *variety*, but rather on *requisite*. In other words, *appropriate* level of variety control. Not too detailed; not too abstract. Controlling what needs to be controlled, and no more. As simple as possible, but no simpler. It's neither possible nor advisable to try to control all variety, for more reasons than we can even start talking about here. But the way I see it, EA itself provides a fundamentally cybernetic mechanism, and is in the business of providing control over forces of chaos and entropy in the enterprise. Thus, perturbations and disturbances that endanger the viability of the enterprise are of utmost concern.

This leads to two perspectives for EA: requisite variety control throughout the enterprise, and requisite variety of EA itself. In both cases we need to ask ourselves, "What are you trying to control?"

In the enterprise, the answers to that question quickly become enormously numerous. A classic case of control in the enterprise is the issue of quality control. The 'clean room' of the semiconductor fabricator controls disturbances by airborne particles. The brewer controls for the right strains of yeast, barley and hops to create the specific type of beer.

Is it important for EA to understand these controls in the enterprise? I think it's basic, to understand the business at this level. Should EA understand the issues for procurement, operations, and HR that control perturbations in these various business areas? In my opinion, yes, even though other professionals may be the respective performers and decision-makers in those areas. Does the architecture of the enterprise need to focus on the key control points throughout the enterprise? I'd say, yes, absolutely.

For EA itself, the essence of variety control is wrapped up in the concept of coherence. EA exists to control the disturbances that lead to incoherence in the enterprise. In a similar way that the clean room controls air quality, EA controls the quality and effectiveness of the overall variety control regime. Is the enterprise effectively controlling its brand image via the way billing is done in addition to the projection of its marketing image? Is it providing the kinds of support for the kinds of work being done in various functional areas? Does it have the kinds of response systems to deal effectively with the relevant regulatory regime?

What kinds of control mechanisms does it take for EA to accomplish this requisite variety control of requisite variety controls? I think this is a fertile field to explore, moving forward. I'd love to keep sharing ideas about this, either on or off of the LinkedIn platform.

For an overview of these postings, see: <https://www.linkedin.com/pulse/overview-postings-doug-mc-david?published=u>

Written by



Doug McDavid

Consultant and mentor in architecture of enterprise

[Sign in](#) to leave your comment

 **Geoff Elliott** Owner, Elliott Partnership - Management Consultancy ... 6h

Doug, great post. To me one of the key EA questions is how to design the transduction boundary between S1 where the work is done and the immediate environment. Organisations cannot simply respond to the immediate environment and so called customer demand as they will always be resource and capability constrained.

Like Reply |  3

 **Allen Woods** Advanced Meta Data - Rule Based Artificial Intelligence... ... 1y

Doug.... Another good post (nicked from your book I believe). Please keep them coming

Like Reply |  2

 **Ron Batdorf** Retired US NAVY CAPTAIN/Senior Industrial Manager who... ... 1y

@Tom Graves - Thanks for commenting and my German reference was maybe somewhat flippant because I know that the German's have been very successful in warfare since Clausewitz's time. In fact when we worked on Rapid Decisive Operations Concept prior to the "Shock and Awe" of the first Iraqi war we looked at Blitzkrieg and using Special Forces early. I think the fact that the coherency of the German Warfare machine under Hitler was exactly your comment about the top guy was calling the shots and fear was running throughout the leadership because failure meant the wrath of Hitler and probably death. Auftragstaktik is somewhat how we also do Mission Command and it was used in the Five Paragraph order that has led to many successes on the field because the intent (awareness of purpose) was passed down to the lowest tactical component of the operations. Fingerspitzengefühl is very similar to our Battle Space Awareness capabilities where we are going now is User Defined Operational Picture. So yes the German's were very good at warfare, but as you mentioned the glue here was fear. I am afraid that the glue today in America is also moving towards fear as the term "politically correct" has now seeped into our own glue.

Like Reply |  1

 **Geoff Elliott** Owner, Elliott Partnership - Management... 6h

but purpose is an emergent property - POSIWID rules

Like Reply

 **Rajiv Gupta, PGDM,ARe,ARM,CSM,LPNLP,TTT** Sparking collective maturity @ intersection of... ... 1y

Thanks for introducing this concept which was used by Stafford Beer. Unfortunately it's not used often.

Like Reply |  2

 **Miklos Janoska** Architect and Resource Team leader at EPAM Systems ... 1y

Great post. As it starts, it reminded my one of those Einstein quotes.

"No problem can be solved from the same level of consciousness that created it."

Like Reply |  1



Tom Graves

Principal Consultant at Tetradian Consulting

... 1y

Great post, [Doug McDavid](#)! Two comments I'd add:

One of Ashby's themes was that to control a context, a control-system needed to be able to handle ('absorb') at least as much variety as was present in the respective context. His point was a real-world context will always contain more variety than any feasible control-system could absorb - hence 'control' is only possible w... [See more](#)

Like Reply |  3  1



Doug McDavid

Consultant and mentor in architecture of...

1y

Thanks for the augmentation, Tom. Exactly so, "'requisite' ain't as simple as it looks!"

Like Reply



Naveen Avatapally MS, PMP

Project Manager at Trianz

... 1y

Good one!

Like Reply |  1



Paul Oude Luttighuis

Adviseur bij Le Blanc Advies

... 1y

Hello Doug, no offence intended! I'll try to be a little less provocative. Thanks, Paul

Like Reply |  1  1



Doug McDavid

Consultant and mentor in architecture of...

1y

Well, Paul, provocative is good. Great, in fact. It's just that I'm one of those guys who says "What box?" To a fault, I think, so that's where I expect pushback -- "Hey Doug, do you really think EA can do everything?" :-)

Like Reply



Ben Gray

Business Architect & Designer

... 1y

Great post, Doug. This chimes with my thinking on Ent/Biz Architecture governing (controlling) the design process. But the nature of the control mechanism is an interesting question, which prompts some fun analogies: EA as Enterprise Policemen? or EA as Benign Dictators? or EA as Religious Clerics? ;o)

Like Reply |  1



Doug McDavid

Consultant and mentor in architecture of...

1y

Thanks for the comment, Ben. It's interesting, though, that you are also reading this in a way that implies rigidity, or some kind of commanding position, as in command and control.

I wish everyone here had background in the Viable Systems Model, because then I could refer to the System Three vs. the System Two functions, and their different ways of managing variety. I'd love to have Stafford Beer's slim book Diagnosing the System For Organizations in the hands of EA practitioners.

One way to think about this is the old 38 Special song. Sometimes the best thing is to "hold on loosely" :-)

Another way I like to think about healthy enterprises is to try to stay in the sweet spot between chaos on the one side, and rigid order on the other extreme. This is a Santa Fe Institute style conception of 'complexity', which is what I prescribe when I do move out of the mode of description and into the mode of prescription. I'm toying with the idea of making a little presentation on that as my first foray into the realm of Udemy. Maybe :-)

Like Reply | 1



Paul Oude Luttighuis
Adviseur bij Le Blanc Advies

... 1y

Hi Doug, I am willing (and used) to have a very broad and flexible idea of what a "system" might be. But even then I would dare to tempt you out of the cybernetic box ;-) Paul

Like Reply | 1



Doug McDavid
Consultant and mentor in architecture of...

1y

OK, if you want to insist that I'm in some kind of box, I guess you'll just have to go ahead and hold that impression, Paul. I'm not going to argue with you about your reading of my words. I've tried very hard to support what you've been saying, but you seem to be having a hard time taking "yes" for an answer :-)

Like Reply



Ron Batdorf
Retired US NAVY CAPTAIN/Senior Industrial Manager who...

... 1y

Doug, I agree with you, my use of coherent is somewhat different than you have described. In physics coherency is on the opposite spectrum than chaos. It is that the universe is balanced by both and that the human falls between them on the scale. When something gets so coherent (controlled on every point of the processes for example) that it is very easy for it to fail b... **See more**

Like Reply | 2 2



Doug McDavid
Consultant and mentor in architecture of...

1y

Thanks for the elaboration Ron. I will have to be more careful to clarify my use of "coherent". I will need to take into account that there's a sense of the word that connotes rigidity and regimentation (which in some circumstances is appropriate). I actually can't find a dictionary definition that specifies that meaning.

Like Reply



Tom Graves
Principal Consultant at Tetradian Consulting

1y

Very good point, **Ron Batdorf**, about the difference between the physics notion of coherency (lockstep-alignment) and the looser / more-flexible sense of coherency as 'aligning to purpose' that I believe **Doug McDavid** is describing.

Not sure, though, about that view of the German Army in WWII: don't forget that the Germans were also masters of flexibility, in auftragstaktik... **See more**

Like Reply



Richard DeLisle

President at Richard L. DeLisle, Inc.

... 1y

The issue is of enormous interest. While modeling is of import, more so simulation. That however implies control which, by definition, is subjective. Nature's controls entertain incredible variety which evolve as the "varieties" evolve. Both variety in controls and systems are pluralistic, operating concurrently in multiple dimensions. We (humans) have difficulty with the... **See more**

Like Reply | 1 1



Doug McDavid

Consultant and mentor in architecture of...

1y

Well, Richard, it's my intent to help some of us humans to find and use vocabulary that can support multi-dimensional perception.

Nobody said it would be easy!

Like Reply



Bruce Levitan

Recently retired

... 1y

Great post Doug. The more that cybernetics thinking gets into the likes of EA (and other mechanisms or modelling and controlling the enterprise) the better!

Like Reply | 2 1



Doug McDavid

Consultant and mentor in architecture of...

1y

Thanks, Bruce! Agreed

Like Reply



Paul Oude Luttighuis

Adviseur bij Le Blanc Advies

... 1y

Hi Doug, agreed. As I understand it, the law of requisite variety, and the notion of variety implied by it, is formulated in cybernetic terms ("systems" and "states of systems"). And variety gets a quantitative measure. But, before we even arrive at identifying such "systems" and "states", we have already gone through a lot of EA work, in which a lot of qualitative, and intention-driven issues are dealt with. I perfectly agree with EA being "dealing with diversity", but the main diversity at stake is qualitative/intentional and hence (I would argue) transcends cybernetics. Cheers, Paul

Like Reply | 2



Bruce Levitan

Recently retired

1y

Paul, I'm not sure how qualitative/intentional diversity can transcend cybernetics. Please explain?

Like Reply



Doug McDavid

Consultant and mentor in architecture of...

1y

I don't agree, Paul. It feel so me that you're pushing systems into a narrow box that doesn't fit with my con-

ception. In fact the conception of EA I'm trying to get across starts with systems (biological systems in the form of human beings) whose desires, some inchoate, some even subliminal, are the sources of intent and variety that various trans-individual systems (enterprises) need to be able to amplify and attenuate in coherent ways.

Admittedly, I have been using the concept of systems as my predominant way of understanding the world for the last 45 years or so, so I resist attempts to squeeze that concept into narrow confines :-)

Like Reply | 1



Howard Wiener, MSIA, PMP
Principal Consultant | Enterprise Architect I...

... 1y

Doug:

One thing I always try to assess in people with whom I am going to be working is whether they step up to solve a real problem that exists or squint so as to reduce the scope of what they see and then address the reduced scope of what is still visible to them. On the other hand, there are those that take a reasonably simple problem, complicate it and then address it. Neither of these types produce any real value.

Too many EAs fall into the myopic category--it's a lot easier to produce shelfware and diagrams than it is to solve real problems and bring about real change. Echoing what is doesn't really require much insight and trimming a little around the edges doesn't require much fortitude or courage.

Like Reply | 2 1



Doug McDavid
Consultant and mentor in architecture of...

1y

Nicely said, Howard!

Like Reply



Ron Batdorf
Retired US NAVY CAPTAIN/Senior Industrial Manager who...

... 1y

Good post Doug. In quantum physics it has been discovered that a scale free network can only survive if it isn't being controlled. Therefore control is disseminated to individual nodes that supports the network intent. If that intent is just to survive, then the whole enterprise will do what is necessary at the interfaces of the nodes (capabilities, activities, etc) to fit within a new pattern of linkages to negate the variables that are impacting from the environment. So it is the same in warfare, you don't use a coherent force to fight an asymmetric force such as guerrilla warfare. You use another asymmetric force. The problem is you can lose your purpose unless you keep the intent to the forefront.

Like Reply | 2 1



Doug McDavid
Consultant and mentor in architecture of...

1y

Hi Ron. I really can't speak intelligently about quantum physics, but warfare is clearly a form of enterprise. So it may be that we're using 'coherent' in different ways, which wouldn't be surprising.

I am using it in a sense that I see in an on-line dictionary as a system where "all the different parts fit together in a sensible ... way". For me, then a field unit that behaves like a band of bureaucrats from the Pentagon, or a spit and polish parade drill, while taking on a group of insurgents in a running house-to-house urban battle, would actually be incoherent, truly and fatally. Brigades of bureaucrats or close-order drill do NOT have requisite variety, in many ways, for the situations of the current enterprise of warfare.

And yes, we can't stress intent too much. So thanks for that.

Like Reply



Darryl Carr

Experienced Architect and Builder of Professional...

... 1y

Doug, that's a great article (as always). In reading it, my mind turned toward the use of Principles, as a mechanism to enforce "alignment" more so than "control". It's relevant to point out that this effort should be applied consistently by others in the organisation, not just the EA, which is where we see the "people skills" appearing again. Getting people on board with a shared vision, backed by principles designed to guide people/decisions (and fight entropy) is something that an EA should try to achieve (IMHO).

On a tangent, when I read the title of the article, I initially thought you might be talking about the requisite variety of experience needed by an EA in order to perform the role. I'm referring to the ability to conceptualise, and recognise patterns of behaviour or structure, which requires an EA to have experienced a set of similar circumstances across multiple environments. Perhaps another post?

Like Reply | 2 1



Doug McDavid

Consultant and mentor in architecture of...

1y

Thanks Darryl. As I say, this concept is really fundamental, and opens a very wide subject area, of which this post is just a rudimentary, opening remark! The idea of control, in cybernetics come from the root that means "to steer, navigate or govern"(<https://en.wikipedia.org/wiki/Cybernetics>)

This concept brings quite different connotations when what is being 'steered' is a guided missile than when it is a biological system, like a human being, or when it's a trans-individual living system, such as any form of enterprise. Just to take the idea of managing variety into the biological realm, both the endocrine system and the nervous system come into play.

One cause for humility in the face of the EA challenge is to simply understand analogous mechanisms in the human socio-technical realm, where the elements are subject to individual purposefulness, and 'control' means persuasion, adherence to principles (as you mention).

Yes, one path to explore involves the relevance of variety of experiences. Another has to do with study of various relevant disciplines. All adding richness to the pattern recognition that you mention. That all contributes to why EA is so incredibly interesting, if we'll just embrace the full challenge and potential. IMO :-)

Like Reply | 1



Paul Oude Luttighuis

Adviseur bij Le Blanc Advies

... 1y

Hi Doug,

I like every post stressing (managing) variety rather than (managing) mere uniformity. But, since it is a law inside cybernetics, it cannot be a universal one ;-).

W. Ross Ashby was keen enough to add: "The observer and his powers of discrimination may have to be specified if the variety is to be well defined." Maybe an enterprise architect should also turn his attention to that "observer", including him- or herself.

Even variety is subject to intention.

Cheers

Paul

Like Reply | 1



Doug McDavid

Consultant and mentor in architecture of...

1y

Not sure what you mean by "inside" cybernetics. I do know that you've brought up, for instance, the intentionality of rocks on a previous occasion, and I do think that's outside the domain of interest that I'm trying to address.

I do agree absolutely that "Everything said is said by an observer to another observer that could be him or herself", in Humberto Maturana's words. As I get into the various thinkers and thinking that can enrich EA, Maturana is on the top of the list!

You mention that "Even variety is subject to intention", and I would make it a bit stronger by saying everything to do with enterprise is subject to intention. I think we've agreed about that before in these discussions. It bears repeating, and I'm sure will be repeated!

Like Reply



Howard Wiener, MSIA, PMP

Principal Consultant | Enterprise Architect |...

... 1y

Good post, Doug. I think it's quite possible that many of the image problems suffered by EA result from attempting to manage more than is manageable and to manage things that don't really require it.

Like Reply | 1 1



Doug McDavid

Consultant and mentor in architecture of...

1y

Thanks, Howard. Yes, I think you're making an important point about the 'requisite' issue. Stafford Beer was talking about direct command and control management when he said the following (and I apologize for some technical terms not previously introduced in this posting, but I really love the basic idea)

"Poor managements, having too little insight or training, or suffering from 'corporate paranoia' that has them feeling constantly threatened, disregard the filters, and try to restore Requisite Variety on the central axis. That is, they disregard the resource bargain (where in principle the homeostatic message upward needs to be only 'OK'), and invigilate the horizontal activities with all the zeal of an Inquisition."

The key concept there is invigilation :-)) with the zeal of an inquisition! Maybe that's where JC is hinting at a 'dark side'?

Like Reply



Rahul Saxena

Data-driven strategy and execution

... 1y

Spot-on, Doug!

I, too, have been trying to articulate the importance of enterprise controls. I use a different terminology: Decision Points (like your "controls", I think) adding up to a Decision Architecture, and try to illustrate its importance for business analytics, ref <http://www.cobotsystems.com/design-decision-analytics-architecture-en-us.htm>.

Like Reply | 1 6

View previous replies (4)



Geoff Elliott

Owner, Elliott Partnership - Management...

1h

Hi Peter, typo they are socio technical systems - sorry

Like **Reply**



Geoff Elliott

Owner, Elliott Partnership - Management...

1h

Hi Peter, the discussion on MM is interesting. To me these are simply our personal sensmaking mechanisms which cannot be transferred from one person to another. We are constantly updating our own MMs via experiential learning However an understanding how the brain works does not really address that each everyone us suffers from bounded rationality, cognitive limits and bias. You cannot separate the observer and the observed. This will always have an impact on what is and is not an EA

Like **Reply**

