

For the new SciAM Human Intelligence Emulation user.

An indication of the benefits that can be achieved by the application and use of SciAM HIE.

1. Introduction

1.1. Intelligence and Forecasting and Resourcing.

The brain is the manipulum that sits between the sensorium and the motorium. It is responsible for our survival. In order to survive, any animal must manage its environment. The survival elements of management are (expanded in section 3.):

1. Forecasting,
2. Resourcing
3. Scheduling
4. Monitoring
5. Controlling
6. Signifying

Creatures with the lowest intelligence, such as insects and reptiles, merely Monitor and Control mostly by instinct (e.g. proximity of predators, availability of food, presence of potential mates); the same with Signifying (e.g. what worked the best last time, where is food found – as is demonstrated by bees and ants).

Small mammals and the simplest primates add conscious Scheduling (e.g. sleeping, hunting, fighting), but Resourcing (e.g. locating food or mates) and Signifying (e.g. how did I avoid danger last time, where is the best food) is largely unconscious or instinct.

Upper primates such as the apes appear to add a little of conscious Resourcing (e.g. selecting best mates, most tasty food) and also some Scheduling (e.g. timing of hunting and gathering). Conscious Signifying (e.g. what did we find) becomes quite sophisticated with displays and various levels of communication.

But, in the animal world, only humans address conscious Forecasting (e.g. desired future state) and Resourcing (e.g. best artefacts / skills to achieve) in high levels of detail, and the more intelligent that the individual is, the more he or she focuses on those two key management issues to ensure success. Conversely, the less intelligent individuals are proportionately less able at effective Forecasting and Resourcing. This shows clearly in different groups and populations (it is the basis for separating executive and junior management in commerce, or commissioned officers and non-commissioned officers in the armed forces, for example).

Similarly, aging may reduce the ability to Forecast, Resource and Schedule (e.g. less able to acquire, cook and serve food), less able to Signify (e.g.

confused, incoherent) and even Monitor and Control starts to fail in deeper dementia (e.g. onset of incontinence).

This human ability to focus on effective Forecasting and Resourcing crosses over into commerce and government. Obviously, the better an organisation can perform these and all the other management tasks, the better they will perform. It is this that SciAM HIE focuses upon and that makes a unique and significant difference to the user.

2. What is SciAM (Science of Informational Management)?

Although many products are sold under the banner that they support better decision-making, SciAM HIE goes much further than that. SciAM HIE actually makes decisions. Not just a report or a trigger, SciAM HIE actually makes the best decisions possible - using your information - to ensure successful achievement of your strategic goals and objectives.

It does it in a manner that's actually quite understandable, although it may not sound like that initially. SciAM HIE makes decisions just like a human brain. Although we think of brains as extremely complex, in operation they are actually quite simple. They have to be, they couldn't help us preserve and sustain life if they were impossibly complex.

This is not to say that the brain's wetware (equivalent to hardware) is not complex – it is – just like any modern computer. But what the brain actually *does* (equivalent to software) in terms of making sure we stay alive is pretty straightforward. It has a finite number of things it has to manage and a finite number of ways to achieve this. It is this finite world that SciAM reproduces.

SciAM enables the user to achieve some pretty spectacular things:

- 2.1. The user can use SciAM to audit the adequacy of any information they currently have and determine its ability to support the achievement of strategy.
- 2.2. The user can use SciAM to determine the exact information needs of the organisation in a manner that is simple and effective. This includes strategy, policy, goals and objectives.
- 2.3. The user can interface SciAM with any existing software (SAP, Oracle, Microsoft, HANA, etc.) in order to retrieve or store any information in those products.
- 2.4. The user can use SciAM to extract all of the architectures vital to support of the achievement of strategy. This includes the Enterprise Architecture, Business Architecture, Informational Architecture, Information Architecture, Data Architecture and Application Architecture. SciAM will also provide guidance for the supplier

dependent Technology Architecture, IT Architecture and Network Architecture.

SciAM HIE provides even more futuristic capability:

- 2.5. After the user has entered details of the strategy to be achieved and details of the infrastructure and other resources available to achieve that strategy (usually a relatively quick exercise), then SciAM HIE will identify the weaknesses and priorities in the strategy and suggest corrections. It will include policies on a real-time basis because that is how they manifest. SciAM HIE will then either identify the right information required to optimise decision-making or it will make the necessary decisions by itself in order to apply those resources in a manner that will achieve the strategy in the best possible way.
- 2.6. SciAM HIE can assist management to make better decisions. It can do this one of two ways: i) make a decision itself and have a manager approve it, or ii) make a decision and have it executed without need for approval. Obviously the second scenario will require some confidence from management, but that is easily acquired. SciAM HIE will indicate if policy needs optimising as appropriate.

As a result of all the above, SciAM HIE effectively increases the IQ (Intelligence Quotient) of any management decision making, and, ultimately this increases the average IQ of the whole organisation.

For example, let's assume that a manager with an individual IQ of 100 is employed to make decisions on a day-to-day basis in a complex operation. When SciAM HIE is added to the scenario then the 'combined' IQ will effectively become higher, in the order of, say, 120. As later releases of SciAM HIE become more and more sophisticated then combined IQs will probably exceed 200 and may even reach the 000's. This will enable complex decision-making and the guidance of complex problem resolution far beyond the capability of contemporary methods.

3. How SciAM HIE achieves this

Whilst the intimate details are proprietary - having taken many years of research and subsequent design - the basic details equate to the way that any organism responds to its surroundings. Fundamentally, humans do two things when confronted by a challenge, i) we manage, and ii) we act. Some things we *decide* to do, and some things are just *triggered*. These things are the same whether it is going to bed or constructing an airliner.

Management requires that we perform six basic management tasks outlined earlier:

- 3.1. *Forecast* – The organism determines its goals, i.e. what it needs to achieve in the short, medium or long term.
- 3.2. *Resource* – The organism determines what resources will be required in order to achieve those goals.
- 3.3. *Schedule* – The organism decides when to utilise the resources in tasks that will accomplish those goals.
- 3.4. *Monitor* – The organism regularly checks to see if the tasks are completing as expected.
- 3.5. *Control* – The organism takes corrective action to modify or replace any errant or delinquent tasks as appropriate.
- 3.6. *Signify* – The organism signals the levels of accomplishment of the tasks and stores the results along with any corrective action taken for later comparative analysis in case of a repeat of those tasks.

None of these management steps actually accomplishes anything directly. Also, depending on input processing, SciAM HIE can actually mimic cultural and/or mood responses where required. Output processing can be of a System 1 or System 2 type as appropriate (see para 4.2 below).

Actual activity is handled by a separate set of steps focused on accomplishment.

Accomplishment requires that we trigger five basic activities.

- 3.7. *Prepare* – The artefacts to be applied in the tasks (people, money, infrastructure and product related) are located, acquired, enabled and started as appropriate for subsequent action.
- 3.8. *Source* – The artefacts are then readied at the points and times that the action is to take place.
- 3.9. *Execute* – The artefacts are deployed to produce the goods or services that will satisfy the goal.
- 3.10. *Deliver* – The resulting goods or services are delivered to the required location.
- 3.11. *Review* – The results of the previous four accomplishment activities are checked for level of completion.

None of these accomplishment steps actually manages anything directly. Management is separated into its own activities as shown earlier.

Together the management and accomplishment will be set to react quickly ('gut feel' – System 1) or slowly (carefully considered – System 2), depending on circumstances.

In order to link the six management tasks and the five accomplishment tasks with suitable decisions and/or triggers and in the correct sequences, SciAM uses its proprietary informational science. This formally and simply incorporates policy, procedure, protocol, rules, governance and all information for any possible task within a single software product requiring only one file. SciAM HIE software uses natural language inputs and outputs (infons and memrons). The same SciAM HIE software can manage ANY task and will interface with any existing software at a client site. Future releases may be encapsulated on chips.

Benefit

Putting management and accomplishment together provides a high IQ human-like facility that can be adapted for any scenario of goal achievement from simple product manufacture to complex space flight.

SciAM HIE is unique in its ability to provide software that not only makes available all of the management required (exceptional by itself), but actually links the management to all of the accomplishment activities required as well! This world-beating combination provides support for any kind of organisation or industry.

4. SciAM insights

4.1. Basis of the science in SciAM

There were three guides in the formation of SciAM:

- Lord Acton, "...If something exists it has dimensions and those dimensions can be quantified and measured...";
- Lord Kelvin, "...If you can't express it in numbers it isn't science..."; and
- Victor Serebriakoff, "...The sole reason for communication is negentropy (some call it extropy – moving away from chaos)..."

SciAM recognises that if information exists then it must have dimensions and the first task was to identify those dimensions. So far we have discovered 10 and, of these, 7 are critical to day-to-day usage. Each of these dimensions has to be numerically quantifiable and/or disaggregatable and thus the challenge was to find the numerically quantifiable attributes and a manner in which to specify them.

After 30 years of research, SciAM has revealed things about information that aren't even imaginable to the layman and that no-one else appears to be researching. With SciAM we can truly understand information

The net result is proper application of all forms of information in a human-like manner.

4.2. *SciAM's foundation - Know and Flow*

When breaking information down into its component parts, it is best to start at the simplest level. Information has two key attributes, *know* and *flow*. *Know* is the knowledge you have in your head or on your hard drive or on your bookshelf. *Flow* is the way information is communicated, from person to person, from page to eye, from loudspeaker to ear, etc. What is really important to realise is this:

- Know doesn't flow, and
- Flow doesn't know!

Let's look at these a little closer. First, "Know doesn't flow". Your knowledge stays right in your head, the printed word stays right in the book. If knowledge flowed then I would be getting dumber as I typed this page, and the print would disappear as you read it. No, I am just communicating so my knowledge stays where it is.

Next, "Flow doesn't know". There is no knowledge in the squiggles you are reading from this page or in any sounds that you may hear in the air. It is your interpretation of these squiggles and sounds based on your knowledge of language that makes them of use to you.

This leads us to conclude that flow-based tools are great at modelling communication – because it flows - but are spectacularly useless at modelling knowledge - because knowledge doesn't flow. You can't use flow-based tools to establish your know-base, so to speak. You actually need know-based tools and these are presently unique to SciAM.

Next, we have to see the similarities between money and information.

4.3. *Similarity of Money and Information*

Money appears to be unique in that it behaves like a 'common good', i.e. ownership and consumption are not necessarily exclusive and sharing may even augment total value. These same properties are shared with information, largely because all money is information and thus anything that applies to money is a subset of what applies to information, and anything that applies to information is a superset of what applies to money.

Unsurprisingly, economics (the management of the application of money) and infonomics (the management of the application of information) share the same root and foundation.

4.4. Occurrences

In general, everything related to financials is well defined and understood, but, traditionally, that related to informationals is subject to constant interpretation and invention. This is because Financial Management is a science based on a foundation of debits and credits, whereas traditional Information Management is mostly transaction-based, dead-reckoning common-sense with lots of subjective variations.

Financial management and accounting has an occurrence-based foundation, these are the occurrences of debits and credits, so called because debits and credits *occur* within any financial transaction. Financial transactions like lending, borrowing, buying and selling are managed by debits and credits and, as an example, a single sales transaction can incorporate many occurrences of debits and credits.

SciAM also has an occurrence-based foundation, just like that of financial management. To help to understand this, the contemporary view is that financial systems are the only systems based on occurrences whereas informational systems are based on transactions. In SciAM, both financial AND informational systems have an occurrence-base and, better still, these share common attributes.

Uniquely, SciAM has defined three informational occurrences that are the foundation of informational management. They provide the almost identical simplicity to underpin the science. These form the foundation of Informational Accounting.

4.5. Informational Accounting

The SciAM team has, over 30 years, developed a form of informational-accounting that is the equivalent of financial-accounting in that it is based at the occurrence-level rather than the traditional transaction-level.

Instead of attempting to manage hundreds of thousands of informational transaction types, SciAM manages only the three occurrence types that are known to occur within all or any informational transactions. This view dramatically simplifies informational management and, as a result, we have developed a whole host of disciplines and informational tools and methods that are, in essence, similar to their financial equivalents.

The three occurrences are used in all SciAM-based initiatives and tools because they form the basis for checking completeness and balance of any informational specification, including strategy, knowledge and performance.

SciAM tools based on these unique concepts incorporate such things as informational balance-sheets (is corporate information in-balance - it rarely is), income-statements (is information being acquired appropriately - rarely), management-accounting (is strategic information suitable and available -

rarely), asset-registers (what is the value of information in specific areas - rarely known), and many other ponderables.

As a result, SciAM provides rules and laws that apply to any situation in which information is applied and these unlock the power of information in any application. Much of this functionality has been software-ised and it is used to positive effect wherever it is applied. This software-isation is on-going and can be prioritised by user request.

4.6. *Comparison of Financial and Informational Accounting*

SciAM based Informational Accounting (IaA) actually has many similarities with Financial Accounting (FA). For example, in IaA, we look to see if sufficient information is coming in and going out. Very importantly we check to see if information is in or out of balance and whether there is sufficient for optimised operation (there rarely is); and also what informational investments we have that will support operation and growth.

IaA uses accounting techniques that are much like their FA equivalents – they use tables identifying sources, targets, balances, acquisitions, assets, allocations, savings – but, in the case of IaA, not of money, only of information.

Like double-entry bookkeeping shows where financials are out of balance, so the equivalent IaA approach shows where informationals are out of balance. Similarly, where a financial income statement addresses financials coming into the org, an IaA income statement addresses informationals coming in to the org. There are many such tools as would be expected.

In summary, a *financial* system is a set of functionality (finance) based on a foundation of extreme structure (debits and credits). So a software financial application has to have two sets of skills to make it work, skills in finance and skills in debits and credits - they are not the same. Acquiring the skills for manipulating finance (business level) is oddly easier than acquiring the skills for manipulating debits and credits (foundation level). The former can be adequately done in school and with experience. The latter may take years at a university and a long period of articles at an auditing house.

Now consider non-financial systems - such as Human Resources (HR), Acquisitions or Warehousing - they should have a similar two-layer construct, but they don't. The knowledge for supporting HR, procurement or warehousing is available, but the debits and credits layer is missing; and debits and credits wouldn't work for most non-financial systems anyway. That's where SciAM's informational-occurrences make the difference, but these are unknown outside SciAM.

4.7. *Infons and Memrons*

Moving now to memory and the fact that, in general, humans like to keep things simple, we have evolved a memory to store knowledge and we

manipulate our communication according to that memory. Communication is the 'flow' component of information that SciAM labels 'infons'. Memory is the 'know' component of information that is labelled 'memrons'. Acting on an infon requires a call on one or more memrons to determine what can be done and with what.

Thus we can deduce from what we have learned earlier, that the delivery of any objective can be reduced to six management components and five activity components each of which has a small number of related infons and memrons that will ensure delivery.

4.8. *SciAM HIE productised*

Better still, SciAM HIE is not just theory any more, it's a product! Actually three products – e-audit, e-design and e-operate. The same three products work in *any* environment e.g. government, FMCG, mining, commerce, domestic, banking, service, whatever, without changing the code. SciAM HIE needs to be fed only the strategy and the infrastructure to begin actual achievement of the optimised strategy (it usually takes only a day or so to load) and they will then generate or make the necessary decisions.

SciAM HIE uses natural language rules in forms we call 'infons' for inputs and outputs, and it has special rules for roll-down and roll-up of information while ensuring 100% integrity. Infons contain subjects, verbs, objects, adjectives, adverbs in almost any order, as in normal language. The products are in various levels of completion and will be finalised according to user priorities. Written interpretation is already supported; verbal interpretation would be available shortly.

SciAM HIE can interface to, and accept, any kinds of inputs and will interface to, and generate, any kinds of outputs.

It learns like humans do, and it never forgets.

It solves problems like a human. It can get angry, it can be happy, it can have cultural traits, it can get 'married' and share what it knows with its partner. It learns like a human, it has curiosity like a human, it can make gut-feel or considered decisions. It will survive, It can be given principles to 'live' by (like Asimov's 3 laws). And it learns and changes in real-time.

It makes decisions by itself. If you teach it your strategy and tell it what you have to achieve that strategy, then it will tell YOU first, what's wrong with your strategy and how to fix it, and then how to use the resources you identified to achieve what you desire; and tell you if the resources could be improved. It will accept your feedback while it learns. And it can change real-time as conditions change, just like a human.

SciAM HIE will be vital to solving problems of the future and implementing the solutions.

5. SciAM HIE Architecture

5.1. SciAM HIE AAA operation

SciAM HIE is designed to cope *real-time* with an AAA environment that is full of independent activities that have to be managed. These are:

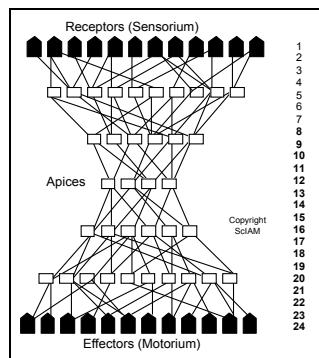
- A1. Asynchronous (we don't know in advance WHEN they may happen),
- A2. Asequential (we don't know in advance what order they will arrive in), and
- A3. Asymmetrical (we don't know in advance whether they will be big or small, good or bad).

But we DO know what must be achieved.

5.2. SciAM HIE AAA polyhierarchy

In the following figure SciAM HIE is particularly focused on steps 10 to 24.

Figure: Polyhierarchical representation of sentience support.



The Sensorium gathers and scans inputs (Steps 1 to 7) for extremes of *good* and *bad* (like a sensory radar) and passes appropriate interpreted Intelligence (Step 8) to the Apices for comparison with existing Knowledge (Step 9) and the derivation of appropriate Strategy (Step 10) and then to manage (Steps 11 to 13) any resulting suitable *good* Action (Steps 14 to 18) and correct any anomalies (Steps 19 and 20), whilst learning from the results (Steps 21 to 23) and keeping stakeholders informed (Step 24).

Levels 1 to 10 appear to be neatly executed by IBM's Watson software;

<http://www.youtube.com/watch?v=FC3IryWr4c8>

levels 14 to 18 are on display in Boston Dynamic's Big-Dog,

<http://www.youtube.com/watch?v=W1czBcnX1Ww>

and modern 'robots' have levels 1 to 8 and 15 to 17 on display, and little else,

<http://www.youtube.com/watch?v=W2v96vDsvts>

hence our belief that SciAM HIE's ability to handle levels 10 to 24 is unique and comprehensive. For example, it can provide the capability to take various actions based on Watson-like inputs and it can provide a 'head' for the Big-Dog and change its priorities or goals as its environment changes. SciAM can interface to any sensorium or motorium processing currently available.

Finally, in order to protect our 35 years (and over 300 man years) of R&D, we will offer its capabilities only via the cloud. We will demo the existing version because there is some training required on the existing interface. In a few months it will have a self-educating interface and users will be able to try their own experiments.

6. SciAM HIE user potential

6.1. Type of user of SciAM HIE

Suitable uses might include the control of robot spacecraft, the monitoring of intelligence, the identification of alien intelligence, the controlling of fusion reactions, the running of multi-national corporates and, literally, any other applications.

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