

# eGanges: Pervasive Peacemaker

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## Abstract

*The new generation shell, eGanges, designed for PDAs, is evaluated as a peace aid. Its interactive visualization of navigable, nested fishbones, called Rivers because of their tributary structure and flow, can represent the Major deductive premises of rules, procedures, policies, causation or strategies (RPPCS). Minor deductive premises are collected from the user input through an interrogation system, and listed appropriately in adversarial Case windows. Extended deductive processing plots the user's case through the nested River maps. Inductive and abductive clarification may be available to assist the user in the selection of a pathway. eGanges applications may also be pervasive.*

**Keywords:** conflict resolution, epistemology, interactive visualization, management aid, user-friendly.

## 1. Pervasive system

eGanges [2][3] is a pervasive shell in at least five ways. Firstly it is designed by reference to a common epistemology which covers the major forms of logic: deduction, induction and abduction; its logic is pervasive. Secondly, the shell is designed to suit PDAs (Personal Digital Assistants), including advanced mobile phone systems; it has click knowledge processing, mnemonic graphics, and some game operations. Thirdly, eGanges is suited to many domains; it manages rules, procedures, policies, complex causation, strategies, or some mix of these types of knowledge. Fourthly, it is user-friendly as it is transparent, easy to learn and use, and flexible for the time available for construction or consultation of an application. Finally, eGanges is a multi-cultural communication system, as it minimizes verbal language; nodes in its interactive visualisation window

have labels, and questions in its small Questions window are pertinent to establishing the existence of conditions in the user's situation. There is little to be translated, and the deductive logic maps of the visualisation permit an understanding of the complexities of alternative choice routes that lead to the same or different Final outcomes; a picture says a thousand words in any language. eGanges can manage the logic of conflicting and contradictory ontologies, and so it may be used as a pervasive peacemaker in all the senses that it is pervasive.

## 2. Law everywhere

Some examples of eGanges applications illustrate its potential. It was originally developed as a shell for the legal domain, but more recently its use in the workplace has been explored. Law and work are themselves pervasive. The first application to be considered was constructed by Philip Argy, Senior Partner in Sydney of the law firm Mallesons Stephen Jaques, Pamela N. Gray and Xenogene Gray in 2004. This application maps the rules of the Australian Spam Act 2003. In the interactive visualisation of the shell, rule maps called Rivers because of their tributary structure and flow, represent the alternative, overlapping pathways of necessary and sufficient conditions, interspersed with conditions that are not necessary and sufficient, as Major premises for extended deduction. Figure 1 shows the Initial map of the legal logic that establishes if it is O.K. for a client to send a message; the message will not breach the Australian legislation. The fan of Rivers in Figure 1 indicates the contrary alternative ways of legally sending a message. eGanges manages disjunction.

Figure 2 is the submap for the node, No Australian link, in the Initial map. Every node that looks like a soccer ball has a submap, and the logic may be as deeply nested as required in this way. The directions of the arrows on each tributary, taken from the algebraic

**eGanges Interface** © Pamela N. Gray, 2002  
 E:\gan\_files\GKE Spam.gan

Ervers

Negative Case

Positive Case

Uncertainties

Current Result page 1 / 23

Answers - select one

Options

Build Consult Update Help Undo Redo Save Search Forward Back

Questions

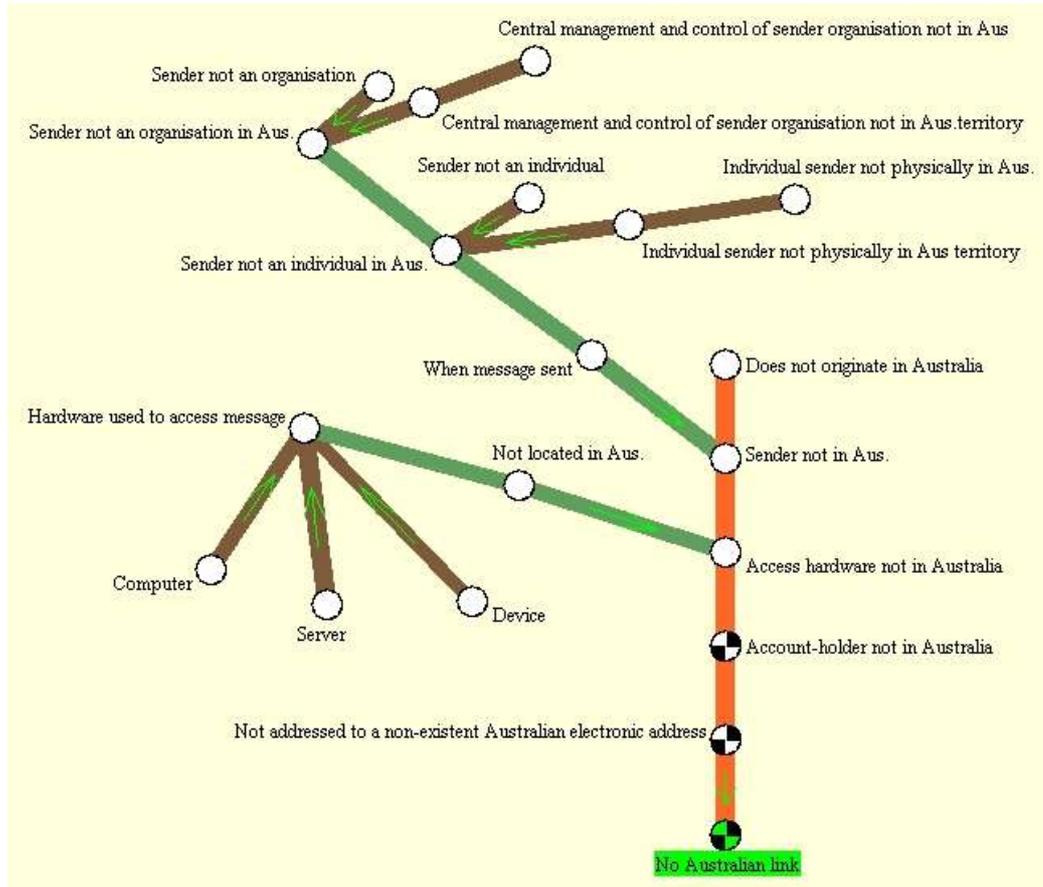
Note

Yes Negative  
 No Positive  
 Uncertain Positive

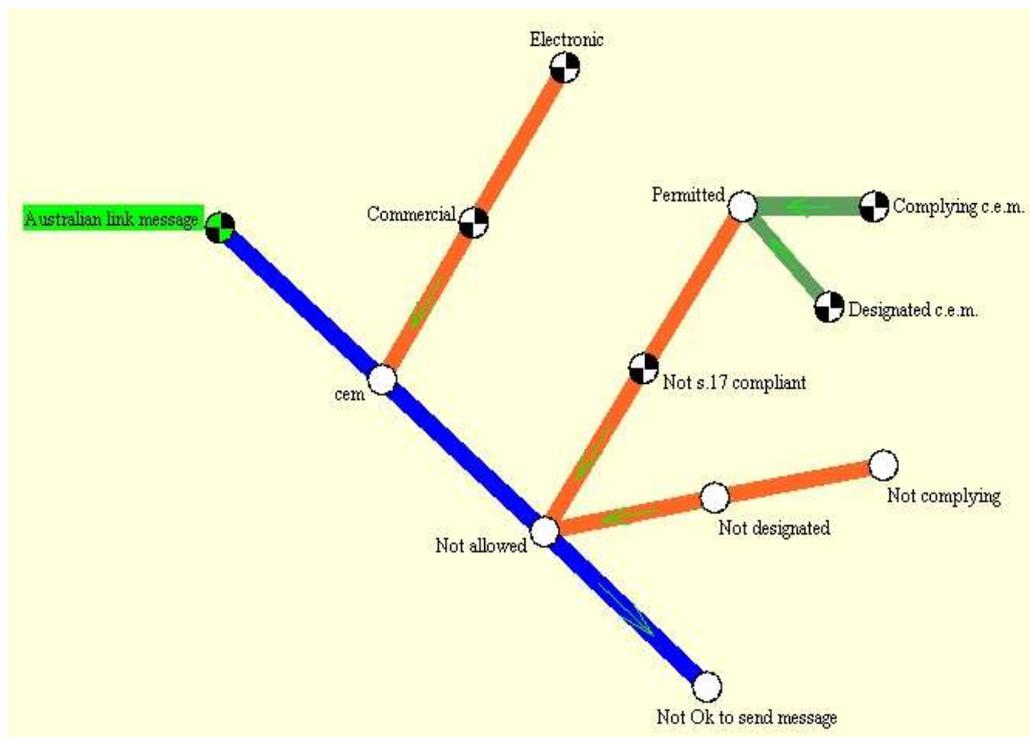
```

    graph TD
      A[Not a commercial electronic message] --> C[Complying c.e.m.]
      A --> D[Designated c.e.m.]
      A --> E[Complies with s.17]
      B[Not an electronic message] --> E
      E --> F[Ok to send message]
      G[No Australian junk] --> F
      H[Complies with s.17] --> F
      I[Permitted] --> C
      I --> D
      I --> E
  
```

**Figure 1: Initial eGanges map for compliance – Australian Spam Act 2003**  
 © Philip Argy, Pamela N. Gray and Xenogene Gray, 2006



**Figure 2: Submap for No Australian link – Australian Spam Act 2003**  
 © Philip Argy, Pamela N. Gray and Xenogene Gray, 2005



**Figure 3: Initial map for prosecution – Australian Spam Act 2003**  
 © Pamela N. Gray and Xenogene Gray, 2005

representation of a conditional proposition, provides reasoning orientation for the course of extended deduction selected by the Minor premises of the user input. Information on a screen may be limited to optimal quantities for human understanding. Maps may be positioned as an art form that also optimizes cognition; they may keep the right and left sides of the brain in a balance of perception and cognition. The functionality of eGanges sorts input answers into the adversarial windows that list points for each party to a Spam dispute, and shows *pro tem* and Final outcomes in the Current result window.

The contradictory Spam application was constructed by Pamela N. Gray and Xenogene Gray in 2005 so that the prosecution map with the Final result of Not O.K. to send message, could be compared to the client's map. Figure 3 is the contradictory Initial map. Law is relative.

The positive case for the client is the contradictory of the positive case for the prosecution. The relative world is pervasive; it is the domain in which peace must be negotiated in any conflict of individuals, groups, Nations, or civilizations. A comparison of contradictory maps reveals the scope for consistent contraries and possible compromise adjustments to resolve conflicts. eGanges was designed to manage the logic of relative conflict as an aid to the resolution of that conflict; furthermore it can go on a PDA wherever it can help.

### **3. Extension of understanding by visualisation**

There are five types of Gloss facilities available to extend the information of the River maps. One is a link from a node in the River map to another program such as Spatial mapping information, a database or a website. Spatial mapping has considerably expanded our understanding of the physical world. Logic mapping can do the same for our understanding of the metaphysical world. Together they amount to expanded intelligence that allows a higher level of intelligent resources for resolution of human conflict, planning optimum quality of human life, and meeting the challenges to human survival that have been introduced by the age of science. With eGanges, visionaries may become pervasive.

A noxious weeds application might include both the metaphysics of the environmental protection legislation and the spatial mapping of the presence of weeds to be eliminated. A second type of eGanges Gloss may provide an inductive spectrum of the sub-species of a noxious weed, with corresponding spatial mapping of actual variations of weeds on particular land; the extent of the actual problem can be understood in relation to the legislative powers of environmental protection. Abductive text advice and keyword Glosses are also available. Finally, eGanges offers a Gloss that links nodes to other nodes in a nested River system, or to nodes in a parallel River system of another application.

### **4. eGanges visions for management**

The eGanges River systems have evolved from Ishikawa fishbone diagrams [5][8] that were developed in Japan after the second world war to improve manufacturing quality. As a representation of complex causation, they were an effective quality control tool for management. The eGanges River systems, with variable shapes permitted by nesting, can manage the extensive and complex information of a broader range of management areas that require the logic of business rules, strategies, policies, procedures, processes and compliance. As a pervasive quality control precision tool, eGanges extends the fishbone paradigm beyond causation in manufacturing quality control into the many possible alternative worlds in management.

An example of an eGanges workplace application, Julian's Bakery job, was constructed in 2005 by Pamela N. Gray, Xenogene Gray and by Lyn M. Treanor who had observed the use of the Ishikawa management aid in Japan for eight years, over the period 1987-2003. Julian's Bakery job maps the vocational procedure of a retail employee in a Bakery franchise from the time of arrival at the shop until the end of the shift. With its system of submaps it details the applied epistemology of the job performance: how to enter the shop by regular or fallback means; how to prepare and maintain the shop for trading; how to trade; how to manage the float; and how to close or hand over to the new shift. On a PDA, the vocational application can be used as a training package; a reference package following training where uncommon problems are encountered; or a supervision package, especially where it is found that enhancements may be required. eGanges application construction and consultation is easy to learn and do. Julian's Bakery job was largely constructed in one day.

Julian's Bakery job maps fairly simple tasks; the job is shown to be far more complex than it is generally regarded. For a skilled job, this precision in training may permit unskilled workers to become skilled workers very quickly. Thus the workforce may be better managed. Even a manager's job could be mapped for quality control purposes. With an eGanges vocational aid, workers could gain a greater understanding of the many facets of their tasks, in the procedures and outcomes, including the causes and effects, to which their work pertains; they may be more competent to participate in the processes of accountability. An upgrade in the capacity of workers, should facilitate higher quality performance of employment duties and enable employees to work smarter, with a greater sense of autonomy and job ownership of their working life.

eGanges is an advanced system, suited to a diverse range of applications in the workplace, from the building of quality control training programs for management and workers to more complex knowledge engineered management meta-systems. As such, eGanges provides an opportunity for a revolution in

management practices, with the potential to create a new arena in which employees and management can work together with greater transparency, precision and co-operation in negotiations and communication. It could lead to more efficient and equitable workplaces with greater harmony.

It is a requirement for management to articulate part or all parts of, extensive bodies of information or knowledge, in decision-making and communication processes, concerning real or hypothetical situations [8]. The eGanges shell can handle extensive, complex information with precision, logic, and clarity. It can be used to aid the management of uncertainty, error, change and chaos that is increasingly pervading decision-making and communication processes in business. With the current crisis facing managers on growing critical issues, identified by such concepts as agile organisations, wicked problems, increasing complexity and regulation, and a global economy [1], better paradigms, strategies and tools become a priority. eGanges offers a pervasive solution to counter such pervasive problems.

## 5. Enhanced OHS

Of particular importance in the specification of work, are the provisions for Occupational Health and Safety (OHS). It is planned to extend the Bakery Project to an application which maps the duties of the employer that correspond to the duties of the Bakery shop employee. For instance, the employer must ensure that stock is available for the employee to sell throughout the day, and also that there is a safe system of work in the shop. eGanges assists the negotiation of mutual jobs that are designed precisely for effective job performance with OHS safeguards for optimum quality workplace life.

Over the past three decades, a large number of countries have adopted systems of OHS self-regulation, first formalised by the Robens Commission in Britain in the mid 1970s. The emphasis has been on tripartitism, in which employers, employees and governments are engaged in making workplaces safer and healthier. However, corporate self-regulation has been criticized because it diminishes OHS as a core corporate activity, engenders confusion about who has fundamental responsibility to improve workplace health and safety, and places employee concerns below those of productivity and profit maximization [7]. An additional problem relates to the inconsistencies and incompatibilities between OHS and equal employment opportunity legislation. This has implications for disadvantaged groups, such as immigrants and female workers generally [6].

Self-regulation dovetails somewhat with the notion that it is in the employers' economic self-interest to foster safety and health at work. Andrew Hopkins [4] has pointed out that both self-regulation and self-interest are rooted in conservative ideologies underpinning economic rationalism and that the

impetus for safety and health derives not so much from concerns about potentially falling profits but from safety-conscious stakeholders, such as labour unions. There are also concerns about the impact of contemporary capital and labour market trends [6]. The problem facing workforces in most countries, advanced industrial or otherwise, has been the shift in the balance of power between capital and labour over the past three decades, towards the former. The problems of self-regulation, of inconsistencies and incompatibilities within relevant existing legislation, of the growth of atypical and peripheralised forms of work organisation, and of employer deniability within the climate of accelerated capital globalisation, will continue to pose major challenges to the union movement in relation to OHS.

The emergence of pervasive technologies, such as eGanges, which will enable employees to determine precisely, at the time when, and place where they need to know, who has responsibility for risks, accidents and diseases in the workplace, will limit the capacity of employers to blame the victims. The logic of conflicts will be better exposed for reconciliation.

## 6. Ideographs for peace

With interactive visualisation of extensive complex knowledge of conflicts, and its logical processing available on PDA technology, comes the opportunity for a more pervasive intelligence and civilised communication in the negotiation and maintenance of peaceful social organisation.

The manufacturing quality control pedigree of the Ishikawa fishbone, extended by its use as logic in the eGanges epistemology, permits pervasive logic for quality control in a wide range of areas, including the social organization of law, conflict resolution, and the organizations of management and labour.

Because its applications can model contradictory cases as alternative, overlapping sets of necessary and sufficient conditions, with provision for irregular, unnecessary and insufficient conditions, and also provision for contextual considerations, as well as having controls on combinatorial implosion and explosion, eGanges is an intelligent aid for the negotiation of peace. It assists in the communication of complex extensive logic, its contradictories and its uncertainties, as the basis for agreement about that logic in a substantive matter. Yet the interface design includes minimal use of natural language and relies on graphics of choice as an international language; a picture says a thousand words in any language. The transparency of its processing makes it trustworthy and not only user-friendly but also multi-cultural friendly as a communication tool.

eGanges applications can facilitate pervasive peace, productivity and safety for and between all participating people and countries, both in the workplace and elsewhere.

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