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Full semantic html version

Marc-Antoine Parent

Professional profile

Title - Software Architect

Expertise - Knowledge representation, Collective Intelligence, Data modeling, Object-Oriented architecture, Natural language processing, Collaborative work

Experience - Total 42 years

Research skills

- Knowledge representation for augmented collective intelligence
- Algorithms and Object-Oriented architecture (UML and Design Patterns)
- Formal models of natural languages

Technical skills

- Languages: Python, Typescript / Javascript, Java, C++, basic Rust, ...
- Data modeling
 - Semantic: JSON-LD, OWL, LinkML, SPARQL, SHACL, RDFlib, ActivityPub, Microdata, Jena, Virtuoso, ...
 - Relational: Postgres, SQLAlchemy, ... familiarity with row-level security and many ORMs
 - Graph: GQL, AGE, Tinkerpop, Neo4J, ...
 - Knowledge mapping: IBIS, Conceptual graphs, AIF, ...
 - Other: UML, GraphQL, LDAP, ...
- Web development
 - Approaches to web data: REST, Microservices, Microformats, Web annotation, XSLT, HATEOS, Redux, ReactiveX, ...
 - Backend: FastAPI, Postgres, Nginx, Node, ExpressJS, Quart, Django, Pyramid, ...
 - Frontend: WebComponents, VueJS, D3, HTML5, htmx, Marionette, ...
- System administration: Ubuntu, Email standards, basic security (Fail2Ban, LetsEncrypt, etc.) Docker, basic Kubernetes, ...
- Content management and collaboration: FedWiki, Pelican static sites, Plone, WordPress, ...
- Natural language processing: Spacy, NLTK, ...
- AI/ML: Reason maintenance, SKLearn, Pandas, Embeddings with pgvector, Structured prompting with LangChain and LlamaIndex, basic constraints (Gecode), ...
- Methodologies: Design Patterns, Domain-driven design, Behavior-driven development, Scrum, ...

Professional experience

2016 - **President** Convergence

- Architecture (in progress) for HyperKnowledge, a next generation event-based protocol for an ecosystem of multi-perspective knowledge graphs
- Development of IdeaLoom, a collective intelligence tool based on Assembl. From product vision to design, architecture and implementation.
 - Used to host the Open Forum of the Viral Open Space (Virtual World Social Forum) in September 2020.

See below for other projects and collaborations

2022-2024 **Software architecture and development, as Convergence** Society Library

- Development of ClaimMiner, a RAG tool (FastAPI, Postgres)

2019- **Software architecture and development, as Convergence** TopicQuests

- Design and development of SenseCraft, a multiplayer sense-making game (Postgres, Typescript)

2016-2019 **Consultant (Software Development, as Convergence)** Bluenove

- Assembl development and optimizations
- Porting Assembl to AWS with Terraform

2013 - 2016 **Responsible R&D intelligence collective**

Bluenove

Research and Development role for Assembl, a collective intelligence tool. Assembl was developed in part in the context of the Catalyst project, by Bluenove and [Imagination for People](#), with initial contributions from [Caravan](#) and the [Institut du Nouveau Monde](#).

- Co-developed (with [Benoit Grégoire](#)) the most part of the data model and information architecture.
- Developed the interoperability infrastructure, as part of the Catalyst project, basing it on a [OWL ontology](#), with links to other ontologies such as [SIOC](#), [OpenAnnotation](#) and [AIF](#).
- Developed a bridge between the ORM ([SQLAlchemy](#)), and the relational-semantic bridge of [Virtuoso](#), so as to synchronize three data models (relational-OO-semantic: see [article](#))
- Developed a generic RESTful layer based on traversal of ORM relationships.
- Developed a real-time client-server synchronisation protocol based on [Websockets](#).
- Developed the security model and the authentication layer.
- Developed most of the engine for synchronisation with external data sources.
- General development of the application.
- Assistance to Catalyst partners for interoperability: Contributions to [Wikitalia's Edgesense](#), help for [Knowledge Media Institute \(Open University\)'s DebateHub](#), and for the collective intelligence metrics engine developed by [Mark Klein](#) from MIT.

2010 - 2015 **Technology secretariat**

[GTN-Québec](#).

Support and advise the community of education ICT practitioners and deciders to use standards.

- Contributed to the evolution of the [Eureka](#) platform, a metadata catalogue for learning resources.
 - [VCard](#) handling (PHP)
 - Post-processing of [LOM](#) for error handling in harvested resources ([XSL](#))
 - Requirement analysis for term equivalence between vocabularies
- Advised [DECclic](#) for use of standards for the evolution of their online course platform
 - Validated the applicability of [IMS-QTI 2.1](#) as a target format for data from [ExamStudio](#)
 - Validated that the [Moodle](#) platform could support [QTI](#) tests, using the [QTItools](#) gateway
 - Recommended use of heterogeneous technologies: widgets, distributed identity, collaboration, etc. to avoid single-platform lock-in
- Maintenance of the [Normetic](#) validator (Java, [Schematron](#), [XSD](#))
- Support on the design of the conceptual model of the [MLR](#) standard
- In charge of the [Normetic](#) section of the [GTN-Québec](#) site

2007 - 2008 **Software Developer**

[Google](#)

Undisclosed project

- General development (Java server, C++ client)
- Design and implementation of extensions to the communication protocol
- Gained experience with both Google-specific and open-source tools and development methods.
 - Client-server protocols with [Protocol buffers](#)
 - Internal tools for distributed process management, interprocess communication
 - Test-driven programming with [JUnit](#)/[GoogleTest](#)
 - Code reviews with [Mondrian](#) and [Perforce](#)
 - Templates and [STL](#)
 - [SQLite](#)
 - [SCons](#)
- Contributed to internationalization infrastructure (Python)

1999 - 2000 **Software Architect**

[Logiciels Panteor inc.](#)

Translateor - Automatic translation system for English and French (project)

- Developed a robust meta-data architecture using [XML](#) for storage of linguistic information in an object-oriented database
- Participated in the development of a OO model for abstract semantic representation of text ([UML](#), [Java](#))

1997 - 1998 **Advisor**

[Centre de Recherche Informatique de Montréal \(CRIM\)](#)

Giza - OO architecture for polymorphic representation of structured data using contextual, dynamic attributes

- Conception and programming (Java) of a new Design Pattern
- Approach was published at [OOPSLA](#)

1995 - 1996 **Senior Research Agent**

[CRIM](#)

Francoroute - Prototype of a classification system for francophone Internet sites

- Team coordination, architecture and programming (Java, [Perl 5](#), [Oracle](#)) of one of the first hybrid web search engines (using both keyword search and category classification), based on the [Cheops](#) approach
- Programming ([Perl 5](#) and [Oracle](#)) of a web spider that explored French sites
- Programming ([Perl 5](#)) of a web-based site classification tool based on [Dewey](#)

	1995 - 1996	Senior Research Agent	CRIM
		<i>CHEOPS</i> - A navigation tool for hierarchical data <ul style="list-style-type: none"> • Programming (Java) of a unique data navigation tool based on visual elision 	
	1994 - 1995	Research Agent	CRIM, for Alis technologies
		<i>Lys</i> - Multilingual mail agent <ul style="list-style-type: none"> • Architecture and programming (C++, ET++) of a Unicode-based mail agent able to handle Arabic, Chinese, Japanese and Korean scripts using font composition 	
	1992 - 1994	Analyst	Les Logiciels Machina Sapiens inc
		<i>Le Correcteur 101</i> v.2.0- French grammar analyzer and checker <ul style="list-style-type: none"> • Team coordination between linguists and programmers, research in computational linguistics, algorithms, programming in C++ • Awards won by the software (version 1.0 or 2.0): <ul style="list-style-type: none"> ◦ 1993, Prix Octas, from the Fédération d'Informatique du Québec ◦ 1994, Prix du Français en Informatique, from GIRICO 	
	1991 - 1992	Programmer	Les Logiciels Machina Sapiens inc.
		<i>Le Correcteur 101</i> v1.0b - French grammar analyzer and checker <ul style="list-style-type: none"> • First grammar checker of the industry to do global parsing of French syntax • Design and programming (C++) of the user interface on a platform-independent framework 	
	1982	Programmer	Société Logidisque enr.
		<i>Têtards</i> - Labyrinth-type two-player video game <ul style="list-style-type: none"> • Programming (6502 on Apple II+) • First video game designed in Québec 	
Education and awards	2002 - 2006	M.Sc in Systems Science	Ottawa University
		<ul style="list-style-type: none"> • First recipient of a departmental bursary in 2003 • Thesis: <i>Construction des normes, entre stratégie et communication: un cas de négociation collective</i>, (Construction of norms, between strategy and communication: a case of collective negotiation.) 	
	1989 - 1990	Qualifying year in Mathematics	McGill University
		<ul style="list-style-type: none"> • Scholarship from F.C.A.R. for a Masters' degree 	
	1986 - 1989	B.Sc. Joint faculty program in Biology and Mathematics	McGill University
		<ul style="list-style-type: none"> • Great Distinction 	
Teaching experience	2003	Teaching Assistant	University of Ottawa
		<i>Economic Systems Design</i> (SYS5140) Designed and presented an introduction to agent-based programming	
	2002	Teaching Assistant	University of Ottawa
		<i>Concepts des langages de programmation</i> (CSI3525) Participated to the design of laboratory demonstration and problems	
	1994 - 1995	Instructor	CRIM
		<i>Séminaire d'Introduction à l'hypertexte</i>	
	1989	Teaching Assistant	McGill University
		<i>Differential calculus</i> (189-121A)	
Publications and workshops		Multiple presentations of HyperKnowledge in many venues, 2016-present, see list	
		Presentation: <i>SenseCraft Game Design</i> , with Jack Park, at the <i>Critical Democracy Tech Conference</i> , May 2023	
		Position paper: <i>Collective Intelligence Design</i> , <i>Collective with the Canonical Debate Lab for the MapsMap challenge</i> , April 2022	
		Presentation: <i>Beyond Topic Classification: Logical Links at the Claim Level</i> , with Jamie Joyce of Society Library for the <i>LD4: Linked Data in Libraries</i> , July 2020	
		Chapter: <i>Perspectives and Overview</i> , in the <i>Future of Text I</i> , Frode Hegeland ed., 2020	
		Report: <i>Harnessing the Power of Collective Intelligence: Communities & Technologies</i> , Collective, final report of the Catalyst project, November 2015	
		Report: <i>Project Testbed: Argument Mapping & Deliberation Analytics</i> , with Anna de Liddo, Mark Klein, Thomas Ullman, as part of the Catalyst project, November 2015	
		Poster: <i>Objects as results from graph queries using an ORM and generated semantic-relational binding</i> , presented at the 13th International Semantic Web Conference, October 19th-23rd 2014, Riva del Garda, Italy; proceedings by	

Springer, Switzerland, 2014. Poster.

Report: *Le TBI, fonctionnalités et pédagogie (Part 1 and 2)*, with Méli^ssa Bricault, *Technologie, March and June 2014*

Report: *Architecture and Cross-Platform Interoperability Specification*, with Benoit Grégoire, as part of the Catalyst project, Mars 2014

Article: *Les tableaux numériques interactifs: considérations d'interopérabilité*, GTN-Québec, May 2011

Tech Note: *On-the-fly contextual adaptation with the RoleAdapter Pattern*, in *Proceedings of OOPSLA'98* (Vancouver BC, 1998), ACM Press

Demonstration : *Applications of the RoleAdapter Pattern: Representing class inheritance and aggregation hierarchies with the Giza framework*, in *Proceedings of OOPSLA'98* (Vancouver BC, 1998), ACM Press

Presentation: *GIZA : A framework for visualization*, with Louis Vroomen, in the workshop: *Graphical User Interfaces for Hierarchies* (Human-Computer Interaction Laboratory, University Of Maryland, 1997)

Article: *Cheops: A Compact Explorer For Complex Hierarchies*, by Luc Beaudoin, Marc-Antoine Parent and Louis Vroomen, in *Visualization '96*, San Francisco, USA, Oct 1996, pp. 87-92

Article: *Font Selection and Font Composition for Unicode*, by Martin J. Dürst and Marc-Antoine Parent, in *Proceedings of the Seventh Unicode Conference*, San Jose, CA, 1995

Languages

Fluent in spoken and written French and English

Interests

My path can be described as a gradual shift of interest from individual to collective cognition processes. After studies in neurobiology and mathematical logic, and after a career in computational linguistics and data visualization, I am now focusing on how software communication tools can shape and enhance group processes, so diverse groups can achieve a common purpose.

To support this, I have experimented with a diverse set of software tools: content management systems, wikis, blogs, real-time collaborative editors, social software... I am also working on new methods that interweave text with more formal representations of human thought. But beyond tools, during my studies in systems science, I have analysed how issues of trust, face and justification affect communication, and how specific communication processes can be designed in a way that helps alleviate those issues.