

PRELIMINARY REPORT ON TECHNOLOGY AND RESEARCH FOR COGNITIO

“Progress in physics comes by taking things apart; in computation, by putting things together. We might have had an analytic science of computation, but as it worked out, we learned more from putting together thermostats and computers than we did from taking apart monkey brains and frog eyes. The science of computation, such as it is, is synthetic.”

- W. Daniel Hills

“This idea that there is generality in the specific is of far-reaching importance.”

- Douglas R. Hofstadter, Gödel, Escher, Bach: An Eternal Golden Braid

I. Introduction

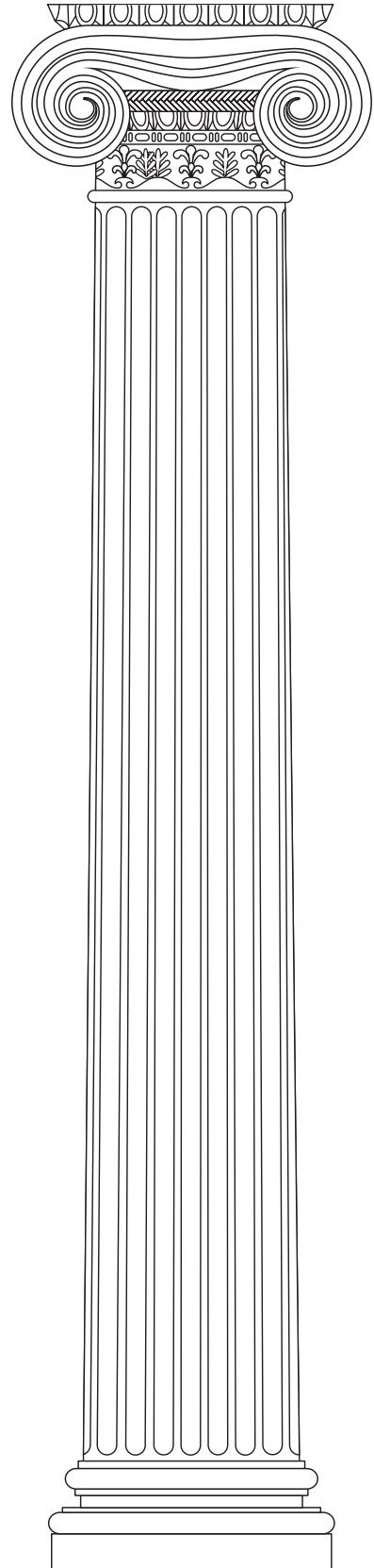
This document is to outline, in broad strokes, the goals of the Cognito project from a technological (and philosophical) point of view. We begin by outlining some general design principles which will inform our work before delving into some of the specific technologies and areas of research which are currently informing our design. Finally, we look at what to expect in the coming months as the Cognito project advances.

II. Design Principles

Compared to most fields of human endeavor the study of computation is still nascent. Despite this fact, it has precipitated changes to the human condition henceforth unimaginable - although we have but only a few generations of study beneath our belts.

Young though the field is, already the curious student of computer science finds that some of the most potent unrealized ideas of the field were first articulated decades ago. Whether because of changes in intellectual fashion or the shifting requirements of industry and commerce - to whom all engineering fields must ultimately plead their usefulness - an enormous number of fascinating techniques are at our disposal today. Some are mere conjectures, while others are well-known techniques used every day in production systems across the globe. We believe that great achievements in computing require not only an admixture of such ideas but also the broad-minded approach which is the hallmark of all true innovation.

A distributed AI platform is a distributed computation platform. And computation - as it relates to human users, their tangible objectives and to the very concept of machine reasoning - is **polysemic**.

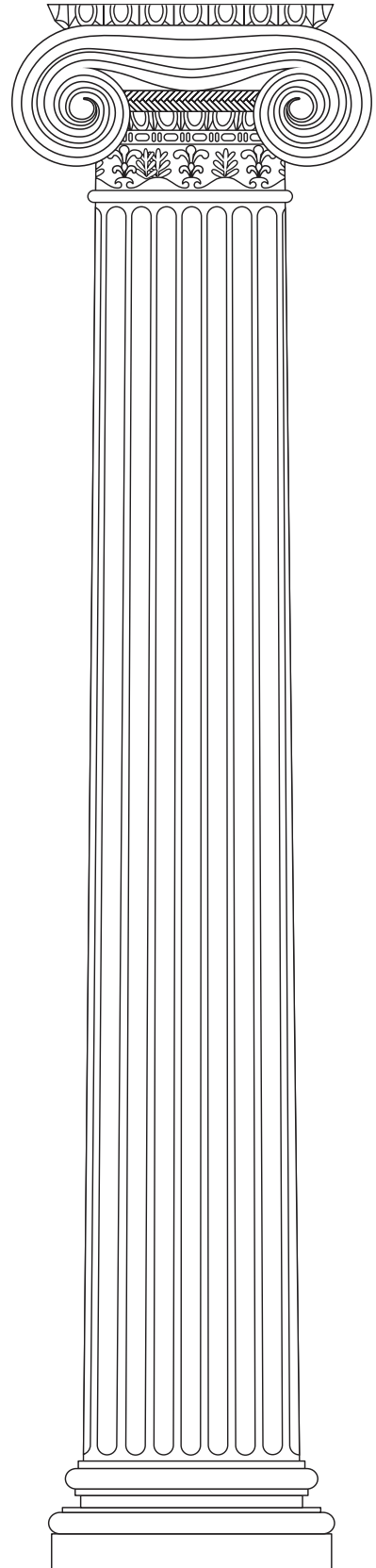


II. Design Principles (Continued)

Therefore, Cognitio aims to approach the question of reasoning on the blockchain armed not only with a long list of ideas worth considering but also with a few key guiding principles:

1. Complexity cannot be manufactured. We aim to create a system which is as simple and unrestrictive as possible, embracing generality and radical extensibility while being able to leverage the existing wealth of software building blocks available for both general-purpose and application-specific hardware.
2. The system must be capable, by virtue of its primitives, of evolving and adapting to suit new use cases and new idioms for thought, both human and artificial.
3. Simplicity and ease of use must not be confused. Abstractions can be built on powerful but unfamiliar primitives while multifaceted and adaptive systems cannot easily be engineered atop narrowly defined primitives.

Lets discuss some of the concrete influences on our current research, however. This may help to shed more light on the motivation and meaning behind these principles.



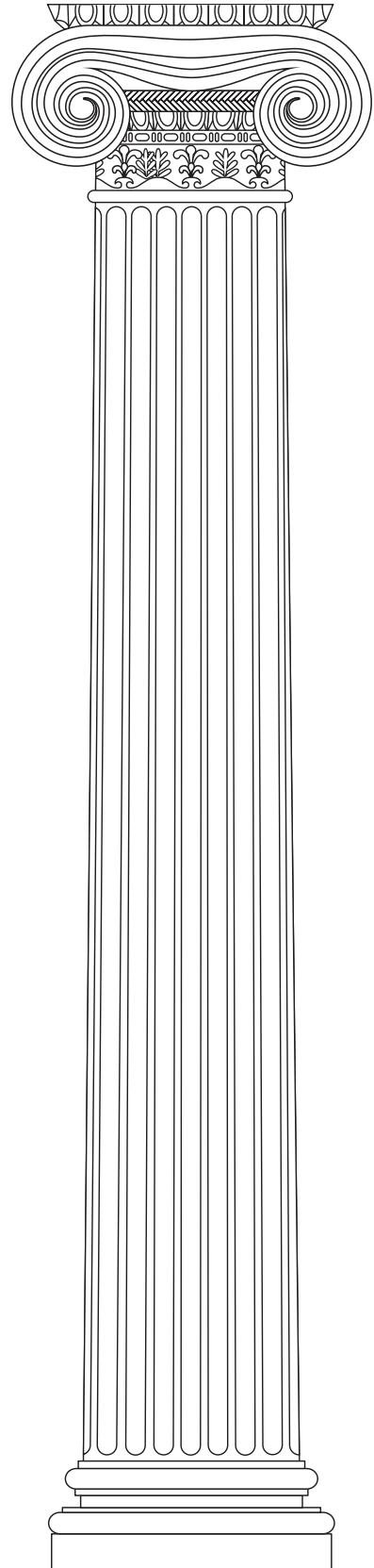
III. Current Research - Directions and Influences

As may be evident from our choice of epigraphs, Cognitio's primary aim is to create a vessel suitable for exploring machine intelligence regardless of which paradigm - or hybrid of paradigms - the user chooses.

To this end, the main thrust of our current research is on what we are tentatively calling the *Nous* - from the gnostic word for man's intellect - the fundamental layer of technology which participants in the Cognitio network will use to model agents. We are aiming to create a runtime which has a number of remarkable qualities:

- An absolute minimum of 'locked-in' runtime semantics, enabling the creation of truly evolutionary and adaptive computing primitives.
- Compatibility with the wealth of existing high-performance C and C++ libraries, making it simpler to add powerful expertise to agents on the network.
- First-class distributed computation primitives such as closures and continuations.
- Tools for formal verification of workloads, to better approximate the computational value of a unit of work.
- Strong security measures to allow the implementation of decentralized trust and reputation protocols.

Inspiration for *Nous* draws from a number of sources, including the amazing research done by the Viewpoints Research Initiative, the works of Douglas Hofstadter, Doug Lenat, Richard Kelsey, Jonathan Rees, Tlon Inc. and many others. Future research reports will outline specifics as the architecture crystallizes.



“We are searching for some kind of harmony between two intangibles: a form which we have not yet designed and a context which we cannot properly describe.”

- Christopher Alexander

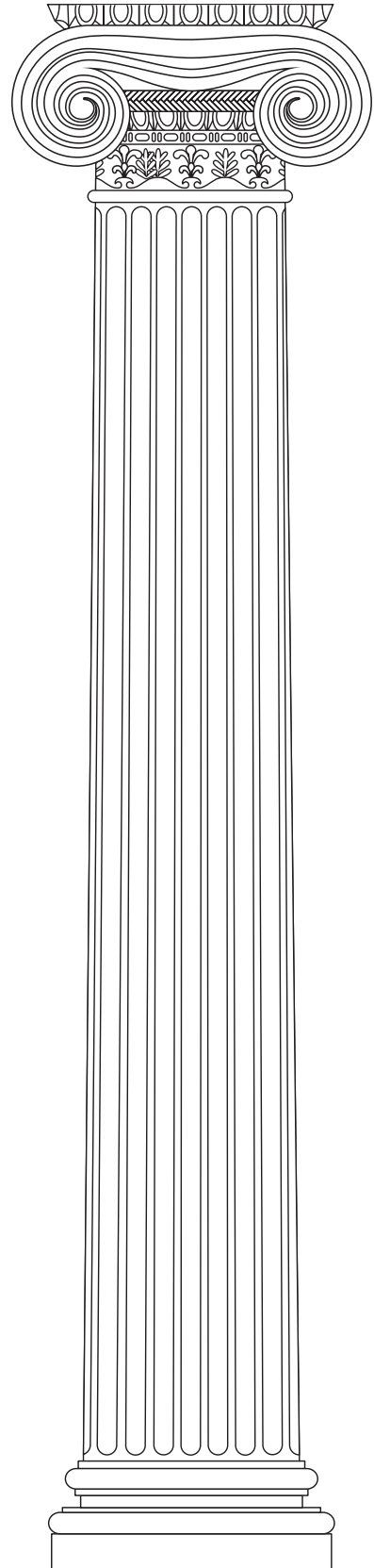
III. Current Research - Directions and Influences (Continued)

Nous is merely the substrate for Cognitio, however. On top of *Nous* we plan to build a rich ecosystem of computing services, and to enable others to participate in the same. Among these is Cognitia, which will bring knowledge engineering to the network and provide leverage for developers of knowledge-based systems, such as the expert systems used in medicine. Our aim with Cognitia is to build a coherent ontological framework which makes knowledge engineering simpler and more accessible. We believe that with a strict adherence to what Arp, Smith and Spear call *ontological realism* we can build a highly-extensible knowledge base with a simple API contract which still - thanks to the flexibility of *Nous* - is able to speak the myriad of semantic standards on the internet today.

IV. Conclusion

Cognitio is clearly an active research project. Over the coming months we will be doing work to create the infrastructure required to keep a project of this magnitude organized, and prioritizing both active development and exploratory development on the current code base. Regular updates from the team and research reports will keep you in the loop as developments take shape.

Cognitio is an ambitious project. Today, more possibilities for breakthroughs in distributed computing - computing of any kind - abound each day. There is a time for ambitious projects, and **that time is now.**



Timeframe	Development	Research
Q3 2018	Project Infrastructure Support, Exchange Listing	Alternative Consensus Implementations
Q4 2018	Security Audit/Updates, Governance Implementation	Nous Architecture
Q1 2019	Governance Release, Whitepaper	Content Addressing Schemes & Storage
Q2 2019		Agent Prototyping with Nous
Q3 2019	Lightning Network	Identity, Security, Reputation
Q4 2019	Cognitia Research Report, ProtoNous testnet	Upper Ontology architecture

END OF PRELIMINARY REPORT ON TECHNOLOGY AND RESEARCH FOR COGNITIO

