Josh Lobel
Computation Group
School of Architecture + Planning
Massachusetts Institute of Technology

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Poster Abstract:

> *Now paper is cheap, but it is an unwieldy medium for storage and retrieval of large amounts of graphic information.*
> *– Bill Mitchell, Digital Design Media, 1995*

The management and coordination of design information has become a critical issue with regard to increasing demands on contemporary architectural design projects. Paper-based design documentation is no longer an effective medium for capturing or translating descriptions of many architectural design projects. Further, contemporary software platforms do not provide useful means for creating and exchanging design documents. If design is one of the foundations for change in society, then the current world of design information exchange is unsuited to meet the requirements of contemporary designers and needs to be improved.

Aiming to achieve project constraints which require greater overall project performance, tighter construction tolerances, higher levels of geometric complexity, increased sustainability, and reduced environmental impact, architecture has borrowed software solutions as well as fabrication and assembly methods from the automotive, aerospace, and shipbuilding industries. While providing technical solutions, this approach has not helped address the unique challenges faced by architects and designers to consistently create, exchange, and interpret design documentation. Advances in technology have given designers the ability to generate vast amount of design information, but not necessarily the capacity to rationalize, manage or utilize the information effectively.

The basis of many CAD systems in hierarchal derivation histories (dependency chains) limit, what Donald Schön termed the "reflective" practice of design. Additionally, the specific drawing and modeling techniques an individual uses to generate form in a CAD environment does not necessarily relate to the design intent. Such history-based CAD models simply record the *process*, without any understanding of the *product*; in these environments, the process is the product. If we accept that the development of CAD software carries with it cultural and procedural assumptions of those involved in its development, then without a critical awareness of an environment's background architects run the risk of unwittingly making those values and methods inherent to their own design process.

This poster represents ongoing research into a method for the creation, extraction, and validation of independent, variable descriptions of design while maintaining a persistent outcome. The objective is to free the design (geometry) from formal dependence on the constituent elements and methods by which it was created (recorded as a history-tree in most CAD software). The purpose is to aid the design process by providing designers and

downstream consultants the ability to redefine and re-parameterize geometry 'on-the-fly' while maintaining consistency with the original design idea. The intended outcome is a computational framework in which diverse design descriptions can be aggregated to produce a cognitive mapping of the design intention. This can theoretically be achieved by creating 'normalized' classes in object-oriented programming in conjunction with XML-based rule schemas which define how the classes and geometry relate.

Extensible rule-definition methods such as XML and RDF rely on basic rules of syntax, allowing for diverse semantic and/or graphical rule schema based on individual user requirements. Schema can be validated with respect to each other with inconsistencies quickly identified and resolved. Considering as proprietary any information about how the geometric primitives of a form were generated or parameterized, the majority of CAD programs only export 'dumb' geometry to non-proprietary file formats. This typically creates issues with respect to interoperability and file transfer between different CAD systems. Since the proposed approach only concerns the geometry itself, this problem can be averted. The objective is to create a more flexible and adaptable design process, akin to Schön's reflective practice of design, without compromising the consistency and determinacy of the design project.