Alliance for Building Regulatory Reform in the Digital Age

A Public/Private Partnership

ATTACHMENT C TO ALLIANCE REPORT

Creating a State-of-the-Art Interoperable Building Regulatory System

Report on Characteristics & Capabilities of Currently Available Commercial Software & Gaps in Current Approaches, Implementations & Technologies

Purpose of this Attachment:

This report was generated as a follow-up document from the September 24, 2003, Summit on Streamlining the Building Regulatory Process Through Interoperability held in New York City. This report identifies differences between currently available software and fully interoperable building regulatory processes to guide the Alliance in working with the hardware/software community to develop strategies/approaches to eliminate those differences.

Objective of Report:

To document, based upon input from jurisdictions and software industry, the characteristics and capabilities of currently available commercial software for building permit processes as well as gaps in current approaches, implementations and technologies.

Source of Input:

This report is based upon input from members of the Alliance's Expanded Core Work Group including GAP analysis studies, RFP's and background information provided by jurisdictions and the software industry.

What this Study Includes:

A GAP analysis is the study of the differences between two different information systems or applications. A gap is the space between where we are and where we want to be. This study includes input from the above jurisdictions' own gap analysis and/or procurement initiatives and an assessment of prevalent building regulatory process system capabilities currently in use.

This analysis focuses on permit processing software identified in the submitted analysis of the above jurisdictions, the model permitting process laid out by the Alliance in Permit Issue Process Map P-2, and vendor supplied information to the above jurisdictions and vendor information from interviews and the Alliance website. Information provided in the GAP analysis section does note software vendor functionality for building regulatory processes P-1 through P-8. Individual firm names have not been used in this report.

Baseline Building Regulatory System:

In preparing this analysis, the Alliance used the P-1 through P-9 building regulatory process maps generated for the New York City Summit as a description of a generic building regulatory system for a building department somewhere in this nation. Maps have been provided with this package as Attachment E and also may be viewed on the Alliance portion of the NCSBCS website (www.ncsbcs.org).

NCSBCS took this approach for the following reason:

The GAP analysis and/or procurement documents provided to NCSBCS by a number of jurisdictions were analysis done of then currently available software against that specific jurisdiction's building regulatory system. In looking at jurisdictions ranging from those with populations in the millions down to those with populations of 25,000, the Alliance had to find a common denominator against which to base this analysis. The work done in August and September 2003 to develop the nine building regulatory process maps, therefore, served as the best common denominator for this review. This analysis looks specifically at the interface of software data exchange needs within the building permit process (P-2) and between that process and six other building regulatory processes. The analysis does include a notation regarding whether or not major software vendors reviewed also offer software packages to cover other building regulatory process functions. Only one of the major software firms is not web-based.

Software Packages Reviewed & Procurement/Gap Analysis Provided to Alliance from Jurisdictions:

Permitting software and other programs reviewed came from six different firms. Each firm also offers systems that can be tailored to varying degrees under consulting or special services agreements.

Findings:

- Characteristics & Capabilities

Each of the six firms' off-the-shelf online permitting software products met with between 60% and 85% confidence the online permitting needs of the jurisdictions that provided us input for this report. In general, most jurisdictions found that the off-the-shelf package could easily be supplemented by either external-custom or third-party software to eliminate the gaps that were found in fulfilling functional and technical requirements.

Jurisdictions surveyed found that most off the shelf software focused on a few core functional areas instead of delivering the breadth of all of the functionality being requested in the procurements. A few other software products take the opposite approach in which they concentrate in delivering all functionality by not focusing on any one functional area.

While this study focuses on software for online permit issuance and processing, each of the several vendors reviewed also provided a suite of products that covered other building regulatory process areas (generally licensing, plans submittal and tracking, enforcement, complaint handling).

Several software firms described their suite of software products (or modules) for multiple regulatory system processes as providing interoperable data--that is data entered for one building regulatory process under one module they marketed could be automatically transferred without data reentry into other modules that firm provided for other regulatory processes (e.g. permits, licensing, and billing). While this is true of their products, the ability to exchange data between software products produced by a single firm, does not constitute "interoperability" in the Alliance's sense. To be interoperable, software products provided by different software firms for different regulatory systems must be able to seamlessly transfer data between the software packages.

The principal finding of this paper is that commercial software packages emphasize internal integration over external information exchange, with the result that jurisdictions cannot mix and match the "best of breed" applications for zoning, permitting, inspecting, etc., according to their needs, nor can they preserve their strategic asset – their data – apart from the software applications in which it resides.

It should be noted that many of the software firms examined can provide customized integration between their software modules and existing systems in a jurisdiction (thus providing some minor degree of interoperability). However, this customization of a COTS package is done at significant expense and generally without warranty as it relates to future releases of the software and/or any changes made to the existing system. Additionally, some intermediateware firms have developed a robust market niche around providing software that creates a data link or bridge between the software systems of two different firms for two different regulatory functions. That market often concentrates on linking older legacy systems in one regulatory function (such as online permitting) with a new off-the-shelf software program for another regulatory system (such as licensing).

In general jurisdictions' comments on custom software packages noted the high expense of such systems and the difficulty over time of maintaining and getting them to interface with other software systems in their state or city. Jurisdictions, like New Jersey, expressed strong desire to move away from customized systems (which the state wrote) for that reason but noted that New Jersey was not prepared to do so until the software industry provided packages that were "truly interoperable" and made provisions to maintain that software over time. Other jurisdictions with customized systems also noted that their systems were not readily expandable and expressed the similar desire to be able to move to off-the-shelf system solutions.

- Interoperability & the Alliance's P-2 Permitting Process

The Alliance's generic P-2 Permit Issuing Process is a fairly basic system in terms of the limited number of data exchange points. The P-2 process interoperable data points include: street address, building and plot numbers, owner information, record permit information, calculating and tracking fees, document management, interface between permit number and date of issuance with plan review, inspections, complaints and enforcement. On the plan review side, the permit must relate to the plan type and assign plan-tracking numbers.

The Alliance's own P-2 Permit Issuing and Tracking Process does not contain all of the interoperability data exchange points as does the Permit Issuing Process described in the Expanded Core Work Group's High Priority Use Case Template that are needed to have the permitting process fully interoperable with the other eight model processes. (See Alliance report on follow-up actions from the Summit.)

Among those additional areas covered in the Alliance's template are: zoning information, GIS 2-way interface integration, integration with other government agencies, and emergency response. In general, the Alliance found that zoning and GIS 2-way are readily addressed by the software evaluated in this review and two others (integration with other government agencies and emergency response) thus far were not.

- Specific Findings Regarding Gaps in Current Approaches, Implementations and Technologies

As noted below in some detail, while most of the software products reviewed provided functionality for data to be shared within the firm's suite of software products for building regulatory system functions, they did not share data with the software products of other firms from the online permitting software being reviewed to software covering other building regulatory functions. While it is true that some intermediateware firms do provide products and services to jurisdictions that make it possible for software from two different firms to share data across regulatory functions, that bridge is an expensive and complex arrangement for jurisdictions involving multiple procurements, multiple vendors, and constant attention.

GAP ANALYSIS OF SOFTWARE FIRMS & PRODUCTS
Functional Areas

Key: X = Does Not Meet Functionality Needs ◆ IF = Implies Functionality ◆ MF = Meets Functionality ◆ EF = Exceeds Needs

FUNCTIONAL AREAS	Company #1	Company #2	Company #3	Company #4	Company #5	Company #6
P-2 Permitting/Cert. of Occupancy						
- Permitting of structural/ nonstructural components	MF	IF	MF	MF	MF	MF
- Permit application status/ tracking/ exception report	MF	MF	MF	MF	MF	MF
- Complex properties including multiple CO per floor area or building	IF	MF	IF	MF	MF	EF
P-3 Plan Review Submission						
- Electronic plan submission	MF	IF	IF	MF	MF	MF
- Plans Tracking	MF	MF	MF	MF	MF	MF
P-4 Inspection						
- Work Flow	MF	MF	MF	MF	EF	MF
- Status Tracking	MF	MF	MF	MF	MF	MF
- Exception Report	MF	MF	MF	MF	MF	IF
- Supports Mobile Technology	MF	MF	X	IF	MF	MF
P-8 Enforcement/Violation						
- Issue violations	MF	MF	MF	MF	MF	MF
- Track status of violation/ outcomes	MF	MF	MF	MF	MF	MF
P-1 Licensing						
- License for people	MF	MF	IF	MF	IF	MF
- Automatic renewal notice	IF	MF	MF	MF	MF	IF
P-5 Materials & Equipment						
- License certificate	EF	IF	X	MF	IF	MF
Accounting/General Ledger						
- Accounting functions	MF	MF	X	IF	X	MF
- Online fee payment	IF	MF	X	IF	X	IF
History						
- System tracks historical property data, ownership, permits, inspections, violations	MF	IF	MF	MF	MF	X

SOFTWARE FIRMS & PRODUCTS
Technical Requirements

Key: X = Does Not Meet Functionality Needs ◆ IF = Implies Functionality ◆ MF = Meets Functionality ◆ EF = Exceeds Needs

AREAS OF TECHNICAL REQUIREMENTS	Company #1	Company #2	Company #3	Company #4	Company #5	Company #6
<u>GIS</u>						
- System supports GIS/ESRI data queries	MF	MF	X	IF	EF	EF
- Integrates GIS with property queries	IF	MF	X	IF	EF	EF
<u>E-Gov Portal</u>						
- Supports Internet access	MF	IF	X	IF	MF	MF
<u>Records Management</u>						
- Document retrieval	IF	MF	IF	MF	MF	IF
- Document markup	IF	IF	X	IF	IF	IF
<u>Reporting</u>						
- Generates reports/letters	MF	MF	IF	MF	MF	MF
<u>Integration Capabilities</u>						
- Has mechanism	IF	MF	IF	MF	IF	MF
<u>Customization</u>						
- Client modifications	IF	IF	IF	EF	EF	MF

- Software Firms Providing Software Products That Can Be Linked for Multiple Regulatory Functions

Of the above firms reviewed in this study, the Alliance found that the following firms offer a suite of software packages (modules) that, when purchased and installed in a jurisdiction, offered data to be exchanged across the following building regulatory processes (P-1 through P-8).

COMPANY #1	P-1, P-2, P-3, P-4, P-5, P-7 & P-8
COMPANY #2	P-1, P-2, P-4, P-7 & P-8
COMPANY #3	P-2, P-3, P-4, P-7 & P-8
COMPANY #4	P-1, P-2, P-3, P-4, P-5, P-7 & P-8
COMPANY #5	P-1, P-2, P-3, P-4 & P-8
COMPANY #6	P-1, P-2, P-3, P-4, P-5, P-7 & P-8

Alliance Regulatory Processes:

P-1 Licensing	P-6 Maintenance & Reports
P-2 Permitting	P-7 Complaint
P-3 Plan Review	P-8 Enforcement
P-4 Inspection	P-9 Equipment Registration and Use Permitting
P-5 Materials & Equipment	

Other GAPS Identified by Jurisdictions:

In addition to the gaps identified in this paper, jurisdictions participating on the Expanded Core Work Group identified the following areas that need to be addressed by the software industry:

- Need for an interface between software now available and GIS's need for a standard and property mapping.
- Lack of interoperability between automated design systems and building department plan review offices.
- Inability to link building regulatory process software with capital facilities processes including planning, design, scheduling, procurement, construction operations, maintenance, decommissioning and dismantling.

In addition, there is a need for all states to adopt laws allowing, and providing greater clarification for, requirements and acceptability for forms and digital signatures. (This is a major barrier in most states to allowing for electronic plan submittal, review and approval.)

Areas for Further Study and Action on Implementation & Technology:

As noted at the opening of this analysis, additional funding to support a more detailed GAP analysis of hardware and software currently available for all of the nine building regulatory system processes would benefit the Alliance initiative moving forward. That study could be undertaken either in stages, addressing first the building regulatory systems currently most in demand by jurisdictions for acquiring software to support (e.g. online plans submittal, licensing and inspections) or could take a detailed review of all nine building regulatory process systems. In that review, the Alliance also should look at technologies being used by intermediateware firms to bring about data exchange between two different software providers' products. Study also should review status of acceptances by the states of electronic seals for building plans and other documents.

In addition, the Alliance should work with the software industry to explore the use of open standards, XML schema and other technical approaches towards bringing about interoperability among and between the hardware and software available for jurisdictions to use in their building regulatory processes. (See pages 16-19 of Alliance's "Interoperability Background Study" for recommended approaches towards interoperability.)

In reviewing this background study, IT industry attendees at the Summit noted the need for the software used in the building regulatory process to be part of a web-based solution was especially clear from the report. Another recommendation within the report that participants found of value was the need to validate future interoperability work through a proof of concepts approach. There was general consensus also that XML schema should be developed for the project, starting perhaps in one regulatory process area, such as online permitting, electronic plans submittal or inspections, and then moving through the other eight areas.

One of the barriers to more effective use of IT by jurisdictions expressed by the software industry participants on the call was the ability of outside data to come into a jurisdiction's database. It was noted this fear was in part based a virus being introduced into a jurisdiction's database by an outside user/customer.

One vendor noted that there were three ways to address this concern that his firm had pursued with jurisdictions: push jurisdiction and outsider data to a website, actually let users (construction industry and consumers) into the jurisdiction's data, and, thirdly, the vendor hosting the data on its own webservers for the jurisdiction.

Closing Comments & Feedback Requested:

The Alliance provided this study as a point of departure and guide for furthering the Alliance goal of full interoperable building regulatory processes. While the findings show that, within a suite of products provided by individual software firms, data is being effectively exchanged between software products for permit processing and other building regulatory systems, the currently available software does not share data with products provided by other software firms.

A lack of common agreed upon standards, whether it is IAI's IFCs approach or XML schema, stands in the way of full interoperability at this juncture.

The Alliance requests your comments on this report in the following areas:

1. Is this report accurate from your firm's perspective? ___ Yes ___ No Why?

2. Does the report offer any insight as to the next actions the Alliance should take in helping industry to develop and provide interoperable hardware and software for use by jurisdictions in their building regulatory processes. ___ Yes ___ No If yes, what actions?

Lastly, the Alliance wishes to close this study with its expression of appreciation to the software firms that provided information to the Alliance and to the jurisdictions that provided copies of RFP's, comparative analysis of hardware and software, and/or GAP analysis. The Alliance will continue to keep the above documents confidential and access is restricted to personnel so authorized by the jurisdiction involved.

The Alliance has respected the wishes of both jurisdictions and software firms to keep our use of information that they provided generic.