



JTC Resource Bulletin

Introduction to the Next-Generation Court Technology Standards Application Component Model

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Abstract

Court software solutions and, in particular, case management systems (CMSs) have traditionally been implemented as monolithic solutions provided by a single vendor. This one-size-fits-all approach has proven ineffective in today's world of constantly changing requirements and increasing use of technology. Alternatively, a component-based approach allows for logical groupings of functional capabilities (components) that can be implemented independently with standards-based interfaces to support required interactions and work flows. This paper introduces this component-based approach and proposes an Application Component Model for courts.

Document History and Version Control

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This document is a product of the Joint Technology Committee (JTC) established by the Conference of State Court Administrators (COSCA), the National Association for Court Management (NACM) and the National Center for State Courts (NCSC).



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To improve the administration of justice through technology

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Introduction

What is an Application Component Model?

Most courts have a traditional Case Management System (CMS) purchased and implemented as a monolithic system provided by a single vendor.

An application component model (ACM) is an alternative to that current monolithic system. Under an ACM, all automation functions (components) are separately available in the market, and courts can pick and choose which components they want to assemble for their CMS and complementary applications, even components from multiple vendors.

1. An ACM includes interface standards that provide a generic interface for each automation function (component) that enables incorporation of any component into the courts' technology environment. A few examples of automation functions/court components are electronic filing, judicial tools/eBench, public access, jury management and remote audio/video.
2. An ACM would identify and list available court automation functions (components) to help court managers determine which components would enhance what their CMS does for the court and to prioritize which components should be incorporated and in which order.
3. All vendors and all CMS providers would use the same interface standards when developing components. The court manager would not be limited to components offered by their CMS provider.

Background

NextGen Court Technology Standards is a strategic initiative of the Joint Technology Committee (JTC) which represents COSCA, NACM and NCSC. The initiative was funded through a grant from the State Justice Institute (SJI). The products produced in Phase 1 of the project – the Court Business Capability Model and the Court Business Process Model -- were approved by the JTC and can be accessed at <http://www.ncsc.org/About-us/Committees/Joint-Technology-Committee/JTC-Court-Technology-Standards.aspx>.

The National Center for State Courts and the IJIS Institute convened the 2015 Industry Summit, held on November 11-12, 2015. Vendors of court technology solutions and court representatives attending the Summit proposed fast-tracking development of the "Component Design Model" originally planned to occur in Phase 3 of the SJI project plan.

The "Quick Response Team" of the NextGen CMS Standards Working Group prepared this document as an introduction and way forward to development of the Application Component Model.

What is the business problem?

The statement that court managers and judges often make after they've been to a conference and vendor exhibit is, "I saw some whiz-bang technology and we need that." It's up to the court technologists to determine if that piece of technology would fit in the computing environment, and prepare for a discussion with court leadership about how it would align with the long-term vision of the organization. Taking a business-before-technology approach, the best practice is to have access to a business vision and then figure out what technology will support it.

The best practice is to implement business capabilities using a flexible, agile, modular approach. The long-term goal is to meet new business requirements as they emerge. Courts need to break solution capabilities down to a granular level, so they can be recombined to meet or adapt to new business needs. The value of a component model is to illustrate what those modular pieces of technology are.

In a "tightly coupled" system, each part (component) is closely connected and highly dependent on the other parts of the system. In these systems, changes to one part have cascading effects that require changes to each of the other parts it touches. Loose coupling enforces defined interfaces between parts which allows replacement of one part without changing the rest of the system. More flexibility generally has a higher cost – so there is usually a tradeoff between cost and flexibility in the design of any system.

There are many court technologies that may or may not be part of the CMS. The goal of this effort is to promote a common understanding of the components of court technology so that:

- Solution providers choose which components they provide
- Court managers can implement the components with the capabilities they need now, and
- Court managers can implement new components in the future as needed without needing to replace everything else.

Why develop a component model for courts?

A prototype Application Component Model is needed to develop a consensus among court managers and industry about the identity and relationship of application components ("components") that would comprise the foundation of a state-of-the-art court technology environment.

Thinking broadly about components will enable court leaders – including new court managers -- to think strategically about what court technology is needed in any given court computing environment. Using the component model as a reference, court leaders can identify the gaps in their technology environment and, with whatever resources are available, prioritize implementation of the technologies needed to fill those gaps.

In addition to helping court leaders, identifying components will assist solution providers in understanding the business needs of courts. Solution providers develop product roadmaps containing product features that they understand are wanted in the market. After solution providers realize that loosely-coupled components, not monolithic solutions, are desired by courts, the hope is that the market will see introduction of new solutions containing reusable and scalable components and services. This will provide market opportunities to solution providers and increase competition in new market niches. As a benefit to courts, the market will serve new functional and data needs that inevitably emerge, and provide new service models.

When components become available from various vendors in the market, and assuming the components can communicate with each other through standardized services and interfaces, a court will be able to select the “best in class” components to mix-and-match them to achieve the desired functionality with the desired features, to form an interoperable set of court technology functionality.

Intended audience

The intended audience of the component model includes court managers, judicial officers, court CIOs, court consultants, and court technology solution providers.

What is a component?

The approach to identifying components is based on business capability rather than technology. The first step is to identify the “chunks” of functionality (i.e., components) needed to conduct the business of the court.

Components are building blocks of an overall software architecture. Each building block is an abstraction that provides services to other components while fulfilling the capabilities required by the component itself. Communication

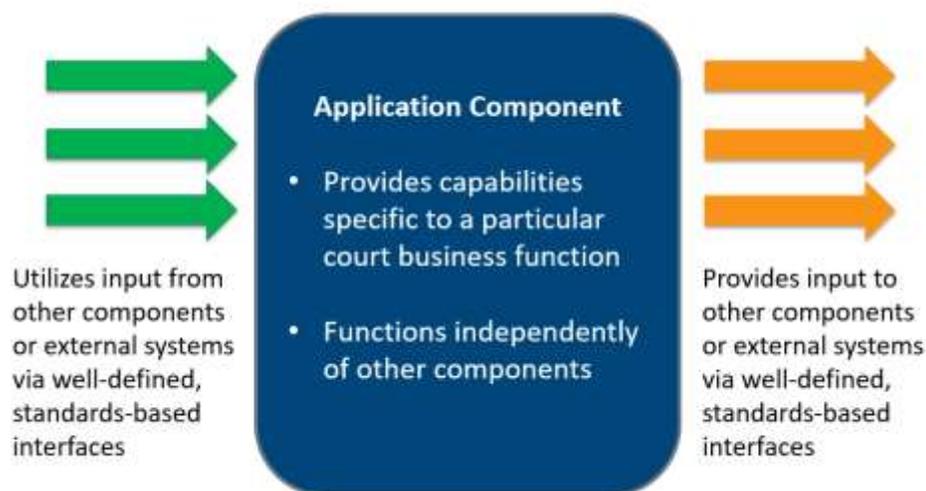


Figure 1 - Fundamental Concepts of an Application Component

with other components is key, so open data standards must be used for interactions between components, including orchestration of how they work together. Figure 1 illustrates some of these concepts.

A description of how components interact with the CMS and with each other is provided in Appendix A: Components Are Triggered by Actions.

Categories of components

For purposes in this document, we are categorizing application components as either “case management” or “additional”:

Components of a traditional monolithic CMS are functions that are traditionally part of legacy CMS currently used in courts. Many CMS solution providers are actively expanding their offerings with additional components. The case management components are listed below:

1. Case Manager
2. Case Participant Manager
3. Accounting / Financial
4. Scheduling / Calendaring
5. Document / Content Management

Additional application components are typically sold separately to add to capabilities of traditional components. Potential additional components are listed below:

1. Electronic Filing Service Provider(s)
2. Electronic Filing Manager
3. Judicial Tools / eBench
4. Public Access
5. Litigant Portal(s)
6. Online Dispute Resolution
7. Jury Management
8. Remote A/V
9. Digital Recording
10. Electronic Transcripts
11. Evidence / Exhibit Management
12. Notifications

13. Electronic Payment Processing

14. Compliance Monitoring

Technology/System-wide capabilities offer functions and features used by components identified above. We do not refer to these system-wide capabilities as components in that they may not be separate software modules or applications, but should be capabilities “baked” into most if not all of the components. Anticipated technology/system-wide capabilities are listed below:

1. Search Engine
2. Reporting / Analytics
3. Business Rules Engine
4. Work Flow Engine
5. Identity Management
6. Knowledge Management
7. Integration Engine
8. Enterprise Security

Figure 2 below illustrates these categories and components within each. The diagram also shows a set of “Case Information Interfaces” with the case management components. This is included to stress how important such interfaces are to additional components and external systems of partners and other stakeholders.

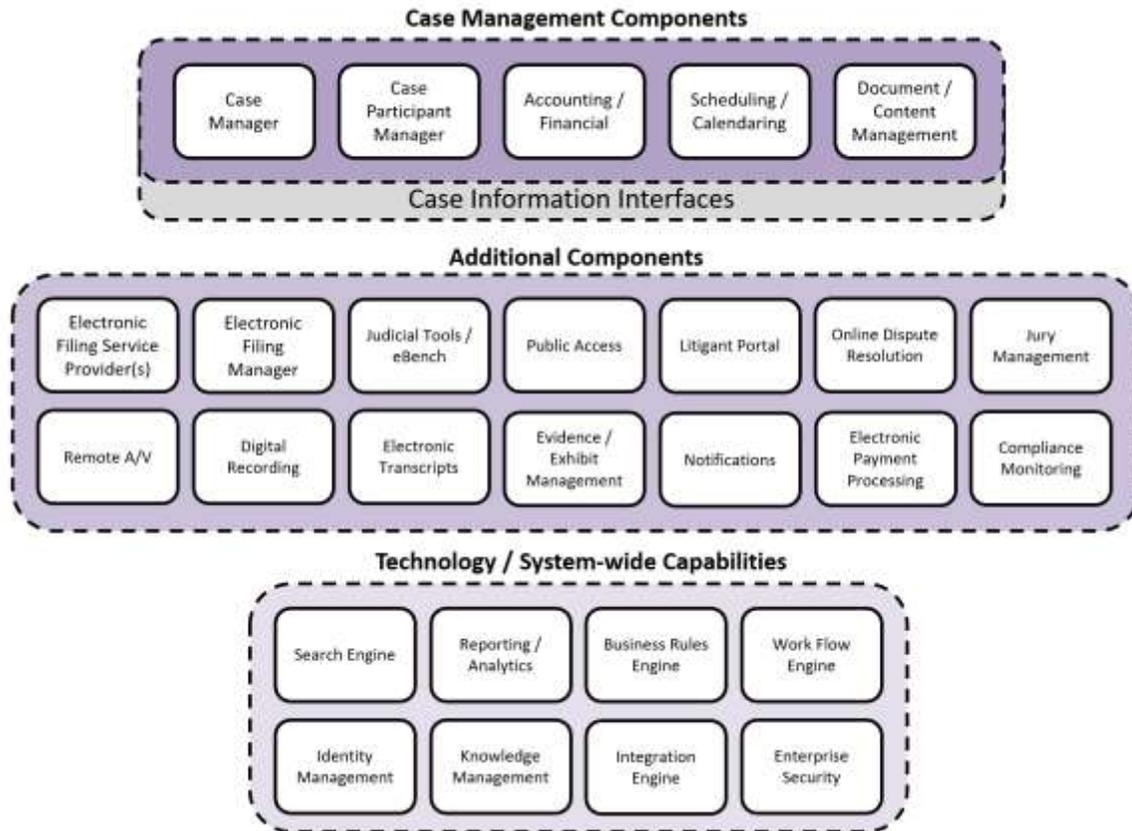


Figure 2 - Application Component Model

Further descriptions of the components are provided in Appendix B: Potential Components.

Scenarios for analyzing and adding components

Most courts have a traditional CMS, and most currently are implemented as a monolithic system provided by a single vendor. A component model allows the following scenarios:

1. The list of additional components informs court managers of the automation functions (potentially) available to enhance what their CMS does for the court. This is the current typical scenario when a court makes the decision to provide e-filing or judicial tools/ eBench in their jurisdiction, and goes through a procurement for their preferred e-filing manager or judicial tools module. A monolithic CMS may have an interface developed to exchange data with a specific additional component because a previous court customer paid for its custom development; it is typically not a generic interface which allows integration with more than a single target module.
2. The component model looks forward to the day that all components are separately available in the market, and courts can pick and choose which components they want to assemble for their CMS, even components from

multiple vendors which, by virtue of standards, will interoperate with each other. For example, a court may prefer Case Manager and Case Participant Manager from Vendor A, Accounting/ Financial from Vendor B, and Scheduling/ Calendaring and Document/ Content Management from Vendor C. In the same way, the court may choose additional components from the same or different vendors.

Characteristics of potential components

1. Components from different providers and in different versions can be swapped – this reduces vendor lock-in if courts can mix-and-match components from different sources (i.e., best in class)
2. Interactions between components and a messaging bus if applicable, use standardized interface models; open data standards enable reusability to govern interaction between components and help avoid reinventing the wheel
3. Components should be platform agnostic in its interactions with other components; ideally a component should not have to concern itself with platforms of other components it's interacting with
4. Components are stand-alone software systems or services that can be developed in-house or acquired commercially (as custom solutions or off-the-shelf software products)
5. Components will typically be configurable and not have to be customized, and configurations are independently deployable for their respective components and versions
6. Components are extensible with the ability to add new functionality or modify existing functionality

Context of prototype components in Court Technology Framework

Identifying components will build on the foundation of the Court Business Capability Model and the Court Business Process Model. It will specify with more detail how the Business, Application, Data and Technology layers of the Court Technology Framework¹ can be addressed in design and development of a state-of-the-art court CMS environment, to meet courts' management, operational, and informational needs.

¹ The Court Technology Framework (CTF) is a concept developed by the Joint Technology Committee (JTC) and the National Center for State Courts (NCSC) as a tool to provide context for existing, and identification of possible new, technology standards initiatives for the courts community; <http://www.ncsc.org/ctfwiki>.

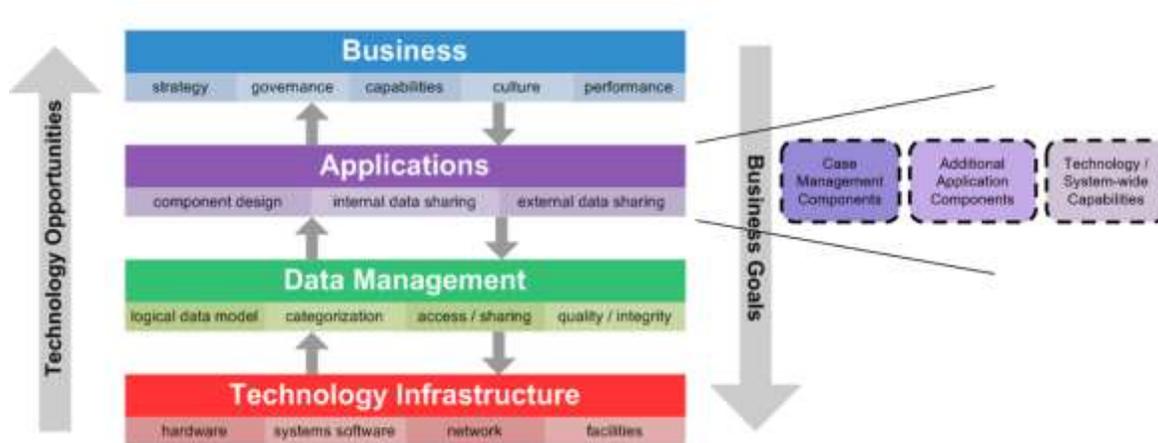


Figure 3 - The CTF and the Application Component Model

The relationships of components to the Applications, Data Management and Technology Infrastructure layers of the CTF are shown in Figure 3. The Business layer of the CTF contains the business functions that court technology should enable.

Potential Benefits

A NextGen components approach will bring about change that will provide the following benefits for the industry as well as Government/Court-run IT shops:

- Help with product roadmap development
- Understand the business needs of the courts and provide efficient solutions
- Help enhance product features
- Help develop new solutions for the courts
- Develop solutions that is based on Service Oriented Architecture – component and services based.
- Develop reusable and scalable solutions

In terms of key value propositions for industry (solution providers, integrators and consultants), NextGen means both Opportunities and Threats:

Opportunities for Court Technology Solution Providers/Vendors

1. Access to new market niches; new service models
2. Accelerated product development – improved focus, agile approaches, better understanding of customer’s needs, faster and more efficient testing
3. New options for niche development –services previously unknown or unavailable

4. Inexpensive, efficient component development from existing solutions – for some
5. Improved ability to compete – as monolithic system RFPs become deconstructed into individual service/component RFPs
6. Less costly, shorter implementations, less exposure
7. Adherence to standards based product development (for components to talk to other vendors' components)

Threats to Court Technology Solution Providers/Vendors

1. Forced to provide standard interfaces for customers to add third-party components
2. Potential obsolescence of monolithic legacy code if unable to interface with additional components
3. Potential loss of market share if competitors have better component offerings, resulting in deterioration of recurring revenue
4. Shallower 'moats' around customers, decreased loyalty
5. Higher worker mobility, less stable work force, more intellectual capacity fluctuations

Opportunities for Court Consultants

1. Better organized/standard functional and technical requirements for RFP development and vendor selection
2. Assists in selecting a best in class solution – mix and match with different components provided by the vendors
3. Better prioritization of core functionality needed
4. Promotes standards development for exchanges (for components to talk to each other, similar to EFSP and EFM in e-filing)

Opportunities for Government/Court-Run IT Shops

1. Improved capacity for local strategy implementation – buy some components, concentrate resources on developing and supporting those components that directly address local needs
2. New cost, service and support models, for court and justice partner customers
3. More transparency and better metrics for build vs. buy decisions

4. More governance options across the application portfolio
5. Opens intra-state and inter-state specialization options, e.g. County X IT focuses on scheduling and calendaring; County Y/State IT focuses on party management, Vendors A and B provide case management, etc. - to the benefit of all court users
6. Shorten the implementation life-cycle

Next steps

The “Quick Response Team” of the NextGen CMS Standards Working Group, by proposing a likely set of application components, demonstrates the feasibility of the concept of components as an essential building block for attaining the next generation of court technology. This model is being more broadly vetted through several collaborative efforts:

- CITOC and IJIS subject matter experts are collaborating with the NCSC and a JTC working group in refining the scope and capabilities of each of the components.
- IJIS is sponsoring efforts to map industry solutions against the component model.
- The JTC will sponsor working groups to define the messages and data models that support priority component interfaces.
- The JTC will support work to vet and refine the five case management components into standards appropriate for application procurement and construction.

In summary, a component model will be developed which will organize the case management application and its ecosystem of related functions into logical components and specify the interactions between components, using open data standards. The components will be able to communicate with other components in a manner that promotes reuse and reduces complexity of applications.

Appendix A: Components Are Triggered by Actions

Anything that happens in a case is the result of some action, either by a user of the system (e.g. a user with hands on a keyboard) or a third-party system that interacts with the system (e.g., a request for data or delivery of data). A user action or an automated action will trigger, for example, Component 1 in the system, which either responds to the trigger with a result, or it triggers Component 2 which responds with a result. Instead of Component 2 just returning a result, Component 2 may trigger Component 3 which triggers Component 4, and so on, with a cascading effect, until the overall business function is achieved and control is returned to the user. When actions are automated,

the components “talk to each other” by triggering other components and contributing results to the business function.

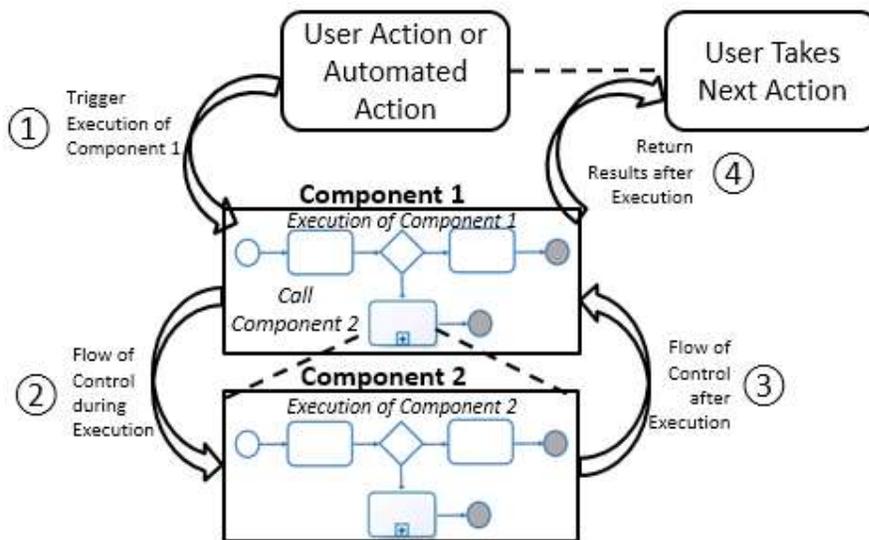


Figure A-1 shows how a user action or automated timer action triggers Component 1 which triggers Component 2 and returns control to the user.

Figure A-1 – Triggering of Components by User Action or by Another Component

The following examples make some assumptions about what components are involved, and are intended to illustrate the general process.

User Action Example 1: Defendant posts bail

- The clerk looks up of the defendant, performed by Component 1.
- Component 1 passes control to Component 2 to perform the accounting step of posting bail on the defendant’s account (and printing a receipt).
- When that step is complete, control passes back to the user to do something else in that case or another case.

User Action Example 2: Third-party system pushes data to the court/clerk CMS (e.g., return of service from sheriff, request for probation violation from probation officer, amended e-citation from police)

- Component 1 performs case number lookup to confirm case exists and, if successful, passes control to Component 2 which updates participant or case data, and queues the next process step if defined
- If there is a document attached, Component 2 passes control to Component 3 which stores and indexes the document image/ data
- When Components 1, 2 and 3 complete their task, Component 2 sends a message back to the third-party system confirming that the actions were performed.

Automated Action Example 1: Trigger is an activated tickler that the deadline has passed for a party who has not responded to a motion filed by an opposing party (as provided by rules of civil procedure)

- Component 1 cancels the tickler, changes the status of the case, and passes control to Component 2
- Component 2 generates and sends a notification to the appropriate judge that the motion should be ruled upon, and transfers control back to Component 1 which sets a tickler that will be canceled when the judge issues a ruling on the motion

Automated Action Example 2: Failure to prosecute a case (either civil or criminal) -- Trigger senses that no action has been taken by a participant based on a parameter setting that if a certain action does not occur within the specified period, a human case manager is notified.

- Component 1 changes the status of the case, and passes control to Component 2
- Component 2 generates and sends a notification to the appropriate human case manager that the action in the case has not occurred, and generates a proposed order (e.g., compliance order, motion to dismiss) for the case manager to review
- The case manager queues the proposed order with a judicial officer; if the judge signs the order, control is transferred back to the case manager who issues the order (scheduling the hearing on the order, updating the list of actions in the case and notifying the parties); and the case is updated with a new status pending action from the scheduled hearing.

Appendix B: Potential Application Components

Case Management Components:

Component	Purpose	Features
Case Manager	Serves as the “traffic cop” to handle interactions among components, and maintains the status of cases.	<p>Performs orchestration of interaction of registered components.</p> <p>Initiates and updates the status and history of each case.</p> <p>Performs case triage.</p> <p>Maintains relationships among cases.</p> <p>Performs notice/order generation with appropriate interactions with other components.</p>
Case Participant Manager	Provides support for managing participants.	<p>Captures, manages and rolls up identities of participants.</p> <p>Manages the roles and relationships of participants to and in cases, e.g. party, representation and type, GAL, witnesses, victims, co-defendants, interpreter, case managers.</p> <p>Manages participant attributes and related information, e.g. addresses, cell/text contact, email and so on, and their associated time-stamps, sources and validation considerations.</p> <p>Provides identity validation support.</p>
Accounting/Financial	Manages monetary matters applicable to the case.	<p>Cost, fees and fines</p> <p>Calculation of cost bills</p> <p>Deposits in banks and reconciliations</p> <p>Trust funds management (e.g., bonds, funds held by the clerk as a stakeholder in landlord/tenant, garnishments, judicial foreclosures)</p> <p>Fiduciary management (e.g., auditing of estates, conservatorships, trusts)</p> <p>Clerk services (certified copies)</p> <p>Professional service vendors (e.g., interpreter, appointed counsel, GAL, mediator)</p> <p>Collection of court-ordered financial obligations</p>
Scheduling/Calendar	Provides support for scheduling and maintaining calendars.	<p>Provides scheduling features, automation and triggers for noticing and deadline management.</p> <p>Captures and provides support for scheduling preferences and restrictions.</p> <p>Captures and maintains calendars.</p> <p>Provides calendar edit functions and related triggers (e.g., reschedule notices).</p>

Component	Purpose	Features
Document/Content Management	Manages the artifacts and evidence applicable in a case.	<ul style="list-style-type: none"> Capture and index electronic documents Redaction of sensitive information Court form repository Document templates - document creation and management for courts and justice partners Metadata - tag generation Records management – archiving, purging

Additional Components:

Component	Purpose	Features
Electronic Filing Service Provider(s)	Provides an online service to help filers file their documents, and acts as the intermediary between the filer and the electronic filing manager.	<ul style="list-style-type: none"> Provides electronic filing services. Accepts and may process payment instructions (via interactions with other components). May provide electronic service options, including document forwarding to process servers. May provide document access services. May provide ancillary case, party and other search options.
Electronic Filing Manager	Provides a single interface for managing the electronic filings to a state or local jurisdiction.	<ul style="list-style-type: none"> Implements the electronic filing governance of a court. Acts as an intermediary between or a hub for electronic filing service providers and the court CMS. Enforces court rules and policies relating to submission of documents to the court.
Judicial Tools/e-Bench	Provides case management and decision-making support to the Judiciary, on and off the bench, and to courtroom staff.	<ul style="list-style-type: none"> Provides docket-specific information that supports decision-making by Judicial Officers. Often provides several CMS functions in a format that is optimized for courtroom use. Functions may include dispositions, order entries, producing and sending orders, setting/scheduling May convey information about referral options, such as roster, availability and cost. May provide geo-spatial information, e.g. parties' places of work, residences, custody and visitation addresses, and so on.
Public Access	Provides qualified, DIY-based access to information about cases, participants, dockets, documents, calendar, financials, and so on.	<ul style="list-style-type: none"> Provides searching on cases, parties, documents, case status and events. May provide notifications and subscription services. May provide support for ordering of certified documents.

Component	Purpose	Features
Litigant Portal	Provides assistance to citizens, particularly self-represented, to help them find legal resources and guide them through court processes	Helps identify legal problem Provides access to various resources appropriate to the legal matter Provides guidance on court processes Provides or integrates with document assembly May provide information on possible outcomes and probabilities based on historical data
Online Dispute Resolution	Provides services to assist in the resolution of cases outside of a physical or virtual courtroom.	Provides features that cover all or parts of dispute resolution online; may be available only to certain case or dispute types. May provide dispute definition and triage services. Usually features one or more dispute resolution mechanisms, e.g. direct propose and answer between parties, facilitated.
Jury Management	Provides functions to support jury management services.	Supports maintaining jury pools and venires. Provides summons support, panel selection, postponement, and disqualification. Supports scheduling, notification and juror payment services. Supports check-in and check-out features.
Remote A/V	Provides audio and video services.	Video arraignment and hearing support Video conferencing Remote interpreting
Digital Recording	Provides electronic management features for recording, accessing and referencing court proceedings.	Records proceedings. Provides indexing and marking features. Provides playback and search features.
Electronic Transcripts	Provides transcription services on demand from contract transcriptionists	Tracks status of requests for transcriptions Assigns transcription tasks to transcriptionists and due dates Tracks status of requests for payment by transcriptionists
Evidence / Exhibit Management	Provides evidence and exhibit tracking and related management services.	Tracks evidence and exhibits, and their locations. May provide access digitally. May support ancillary evidence and exhibit services.

Component	Purpose	Features
Notifications	Provides automated notification services supporting event reminders, event changes, compliance reminders, emergency announcements, etc.	Automated notifications using various methods (calls, text messaging, email, etc.) May also support on-demand service of printing, mailing and tracking of undelivered paper notifications (e.g., jury summonses, mass notifications) Tracks deliver confirmations, returned and non-returned notifications Requests USPS address changes and notifies court of updated addresses
Electronic Payment Processing	Communicates with merchant banking system to process payments	Returns authorization code or denial of transaction Provides payment information for electronic reconciliation
Compliance Monitoring	Provides tools for monitoring compliance with court orders, time standards, court rules, financial obligations, reporting requirements (e.g., guardianship reports), etc.	Receives accounts of court-ordered financial obligations (e.g., fines, costs, restitution) Generates notifications Tracks activity, correspondence and contacts Uses workflow to relate events, conditions and actions relating to compliance Provides tools to support follow-up Supports interfaces to IVR, dialer, court accounting system, tax intercept, DMV, skip tracing, etc.

Technology/System-wide Capabilities:

Capability	Purpose	Features
Search Engine	Searches for and identifies items in a database that correspond to keywords or characters specified by the user	Provides different strategies for search depending on person, case, or other information being searched for Provides options for “intelligent” searches such as semantic searches
Reporting / Analytics	Provides options for reporting and methods of data analysis	Reporting provides canned reports, ad hoc reports, dashboards and alerts for exceptional data Analytics provides deeper insight into data through patterns
Business Rules Engine	Repository of executable business rules that describes business policies or procedures, including workflow.	Allows non-programmers to add or change business logic in a dynamic CMS or business process management (BPM) system Executes business rules and returns result Supports workflow / automated movement of work items from one process or user to another based on established business rules Provides configurable choices for triggering and routing work items

Capability	Purpose	Features
Work Flow Engine	Supports orchestration of tasks in a business process.	<p>Allows user configuration of tasks in a work flow</p> <p>Allows assignment of resources / actors at any point in a work flow process</p> <p>May work in concert with, or even be part of, a business rules engine to implement business rules and court policies</p>
Identity Management	Provides authorization/ authentication	Automates the initiation, capturing, recording and management of user identities and their related access permissions
Knowledge Management	Gathers, organizes, shares, and analyzes its knowledge in terms of resources, documents, and people skills	<p>Maintains lessons learned as guidance for reuse</p> <p>Provides data mining to look for patterns where one event is connected to another event, where one event leads to another later event, or to look for new patterns</p>
Integration Engine	Provides services to manage integrations with other component and external systems	<p>Provides mapping of data fields</p> <p>Supports transformations when needed</p> <p>Allows for customized adapters to interact with legacy systems or non-standards-based interfaces</p> <p>Supports NIEM-conformant exchanges</p>
Enterprise Security	Applies a comprehensive and rigorous method for describing a current and/or future structure and behavior for an organization's security processes	Provides configurable role security templates