

F2\Open Financial Framework

Redefining innovation for the financial services community

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Introducing F2

An open framework created for the financial services industry.

F2 is an open and free web integration framework that has been designed to help you and other financial industry participants develop custom solutions that combine the best tools and content from multiple providers into one, privately-labeled, seamlessly integrated front-end.

The essential components defined by the F2 specification are the Container, Apps, Context and Store—all supported under the hood by F2.js, a JavaScript SDK which provides an extensible foundation powering all F2-based web applications.

With a solution as simple and modern as F2 in place, you will be free to innovate on demand. The F2 standard simplifies projects like state of the art mobile solutions, internal single-dealer desktops, and client-facing portals. However you choose to apply it, the end result is a fully integrated, best-in-class user experience.

F2 provides our industry with a shared specification that makes it more efficient for all of us to develop and integrate innovative web-based solutions across all asset classes and all distribution channels.

By adopting F2, you can immediately share in the benefits of using a common standard that will continuously evolve to meet your changing needs.



The ability to build exactly what you need

F2 enables all of us to build exactly the financial solutions that our customers want. Using this framework, you can efficiently create fully integrated, multi-vendor, multi-asset class and multi-channel Apps, and deploy them in as many different App ecosystems as you want.

F2 is a framework that you can use to build:

1. **customized** solutions that include only the content, tools, and providers that you want,
2. **private-labeled** solutions that are true to your design standards and branding elements,
3. **user-customized** experiences that remember each user's entitlements and preferences,
4. reusable Apps that you can develop once and use **cross-platform** on web, tablet and mobile devices,
5. a **multi-vendor** environment that enables each vendor to use a shared authentication scheme and to communicate context to each other so that they can act together as one.

By making it possible for multiple vendors to work together, F2 makes it possible to select best of breed content and tool providers, and create a fully integrated experience for each user, across all asset classes.

Because the spec is open, free, and exactly what the industry needs, we believe that it will be widely adopted, which will create new markets for app developers, content providers, and create vibrant app ecosystems for our clients.

The screenshot displays the Bankeo platform interface, which is a comprehensive financial intelligence and research solution. The top navigation bar includes links for MARKETS, NEWS, PRODUCTS, RESEARCH, TOOLS, and WORKSPACE, along with a search bar and user profile information for 'SUSAN SMITH'.

The main content area is divided into several sections:

- EQUITY INDICES:** A line chart showing the performance of major indices like Hang Seng, Nikkei, FTSE 100, and DAX over time, categorized by region (ASIA-PACIFIC, EUROPE & AFRICA, AMERICAS).
- S&P 500 SECTOR PERFORMANCE:** A horizontal bar chart showing the percentage change for various sectors including Basic Materials, Financials, Technology, Industrials, Oil & Gas, Consumer Services, Health Care, Consumer Goods, Utilities, and Telecommunications.
- EURO 5Y SOVEREIGN CDS:** A chart showing credit default swap spreads for Spain, Italy, Portugal, France, and Greece.
- SUSAN'S STOCK PICKS:** A list of stocks with their current price, percentage change, and recent price action.
- RESEARCH:** A section featuring insights from recognia INSIGHTS, ANSS, OVTI, DAL, EPI, FE, and MDR, each with a brief summary and a photo of the analyst.
- WATCHLIST TWEETS:** A feed of tweets from users like @MarketCurrents, @CNNMoney, and @CCRM_ca, related to financial news.
- MARKETS NEWS:** A section titled 'IN THE NEWS: GLOBAL NEWS' featuring video clips from CNBC and other news sources, and a list of financial news items such as 'Citigroup in \$590m lawsuit settlement', 'Chile court blocks Batista's power project', and 'Lofty plan builds on pioneering technique'.
- MORE NEWS:** A link to additional news content.

The bottom of the screen features a footer with links for MARKETS, NEWS & COMMENTARY, RESEARCH, TOOLS, and WORKSPACE, and a copyright notice: 'COPYRIGHT 2012 BANKEO INC.'

Favorite F2 features

The screenshot displays the Bankeo application interface, which is a federated search container. It shows several integrated applications:

- EQUITY INDICES:** A chart showing price movements for various indices like Hang Seng, Nikkei, FTSE 100, and DAX.
- S&P 500 SECTOR PERFORMANCE:** A bar chart showing sector growth percentages.
- OPTIONS:** A dropdown menu for options trading.
- EURO 5Y SOVEREIGN CDS:** A chart showing credit default swap spreads for countries like Spain, Italy, Portugal, France, and Greece.
- SUSAN'S STOCK PICKS:** A list of stocks with recent price movements.
- RESEARCH:** A section showing market analysis from sources like Standard & Poor's and Morningstar.
- recognia INSIGHTS:** A section showing technical analysis patterns like Continuation Diamond and Head and Shoulders.
- FINANCIAL TIMES COMPANY NEWS:** A list of news articles from the Financial Times.
- WATCHLIST TWEETS:** A section showing tweets from users on a watchlist.
- REUTERS MARKETS NEWS:** A list of news articles from Reuters.

The interface includes a top navigation bar with links like Markets, News & Commentary, Research, Tools, and Workspace. A search bar at the top right allows users to enter search topics. A user profile for Susan Smith is visible in the top right corner.

Federated search enables the Container to surface the appropriate Apps, even across different asset types.

Excellent example of an App that benefits greatly from responsive design. Navigation elements and size are easily modified to best fit the device.

Apps can be glimpses into larger areas of content. Since entitlements can be set at the user level, it's possible that the research App view on the home page has different default settings depending on the user's role.

This third-party App is still customized to match Bankeo's look and feel while retaining Twitter brand elements.

Streaming video won't slow down the overall page load time since the video is hosted elsewhere and by the provider most qualified to do so. Video hosting costs become a non-issue for Bankeo. The provider needs only create an App one time and it can be viewed singularly or as part of an aggregated view.

Personalization is possible and streaming content can happen in an App without a performance impact to other Apps.

One-off App development means users have new and relevant content faster than in a deployed code model. Innovation is rewarded by swift time to market schedules and integration simplification.

Approved, third-party subscriptions can be included in the user's customized menus without any extra work. The menu structure flexibility makes it so Bankeo doesn't need to do anything in order for this App to show up for this entitled user.

The F2 multi-vendor approach enables project owners to select the best vendor for each content set and each tool. Now it is possible to create a best-in-breed solution every time, according to the owner's definition of "best".

The Framework

The F2 open framework enables a division of labor among multiple parties who contribute to an integrated experience.

By separating responsibilities into those of Container and Apps, F2 makes it possible for project owners to pick who they want to partner with, if anyone, for the development and hosting of their Container and the Apps that they wish to include.

The Container

Containers can be developed and hosted by any party. It assumes the role of traffic cop, managing what data goes where.

The Apps

"Application software, also known as an application or an app, is computer software designed to help the user to perform specific tasks." (Wikipedia)

1. The Container

The Container is where Apps reside and acts as the user-interface. It is multi-channel and delivers capabilities via the internet to desktops, tablet and smart phone devices.

Container Features

- Can be built and hosted by any party.
- May take shape as entire web sites or thin wrappers around smaller content areas.
- Stores preferences, entitlements, login details and user-specific menus.
- Infrastructure that supports the App ecosystem.
- Can be private or public.
- Look and feel is fully integrated with the container owner's brand.
- Supports the Apps and content chosen by owner.
- Container is responsible for:
 - Configuration preferences
 - Common user-specific menus
 - Federated search
 - Inter-App communication
 - Framing of Apps on the grid

2. The Apps

Apps are synonymous with modules, widgets and portlets. Think charts, portfolios, trade tickets, and screeners. They only need to be programmed once, no matter where they will be used.

App Features

- Apps can be viewed as single modules or integrated as part of a larger App ecosystem.
- Can be private or public.
- They are called by the Container and passed applicable information like who the user is, entitlements, context, and size.
- May be developed by anyone but will function together and seamlessly.
- HTML, web based, not downloaded.
- The App spec will enable the developer to use one set of code to provide Apps for all containers that adhere to this open spec.

3. The Store

This is the foundation for the F2 App Community. Apps will be available for Container Providers to select and entitle and customers will have access to purchase Apps.

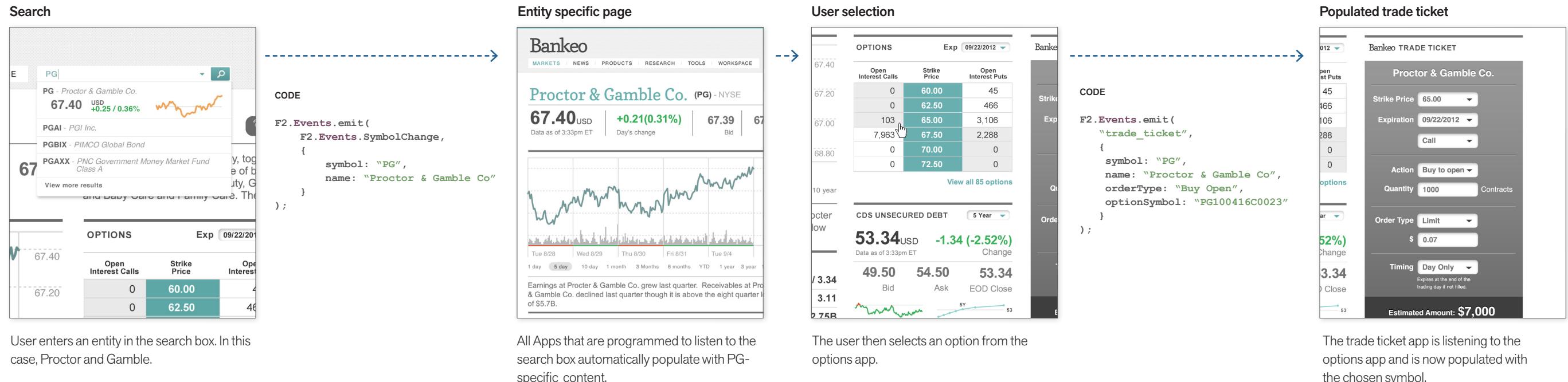
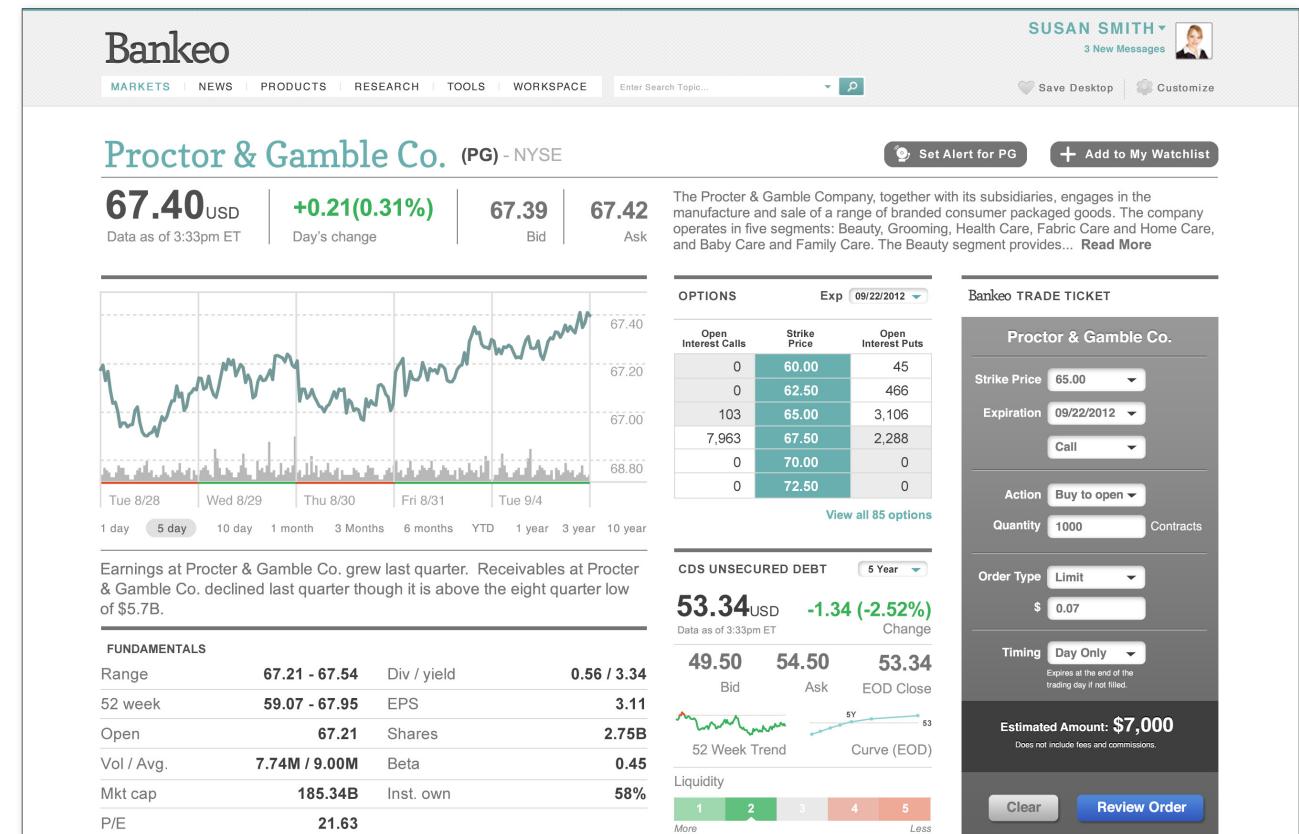
Store Features

- Place where presentation and data App selection occurs.
- Customers can buy an App by using an electronic payment mechanism.
- Entitled users can charge their company for an App.
- Vendors can entitle their customers.
- Foundation for financial App community.
- Contents of Store are controlled by Container Owner.
- The store handles all business models used by vendors including time-based subscriptions, usage-based, and free trials.

Context-passing

Apps are capable of sharing context with the Container and other nearby Apps. This means if a user wants to create a ticker-focused workspace so they can keep a close eye on shares of Proctor & Gamble, the Container can send “symbol context” to any listening Apps that are smart enough to refresh when PG is entered in the search box.

While Apps can have context themselves, the responsibility for managing context switching or context passing falls on the Container. The Container assumes the role of a traffic cop—managing which data goes where. By using JavaScript events, the Container can listen for events sent by apps and likewise apps can listen for events sent by the container. To provide a layer of security, this means Apps cannot communicate directly with other Apps on their own; Apps must communicate via the container to other apps.



Creating an integrated look and feel

The Grid

In order to make it so that Apps look good together in a multi-provider environment, the spec recommends that each App adhere to a standard, Container-controlled grid. F2 relies on a responsive, 12-column grid system, and is flexible enough to accommodate everyone's needs.

Single App Displays

While F2 is designed to handle several Apps being displayed simultaneously, it doesn't have to. The spec also permits full screen, single-provider displays. This allows the Container owner to incorporate legacy, full screen content, with the least amount of effort.

Customizable Look and Feel

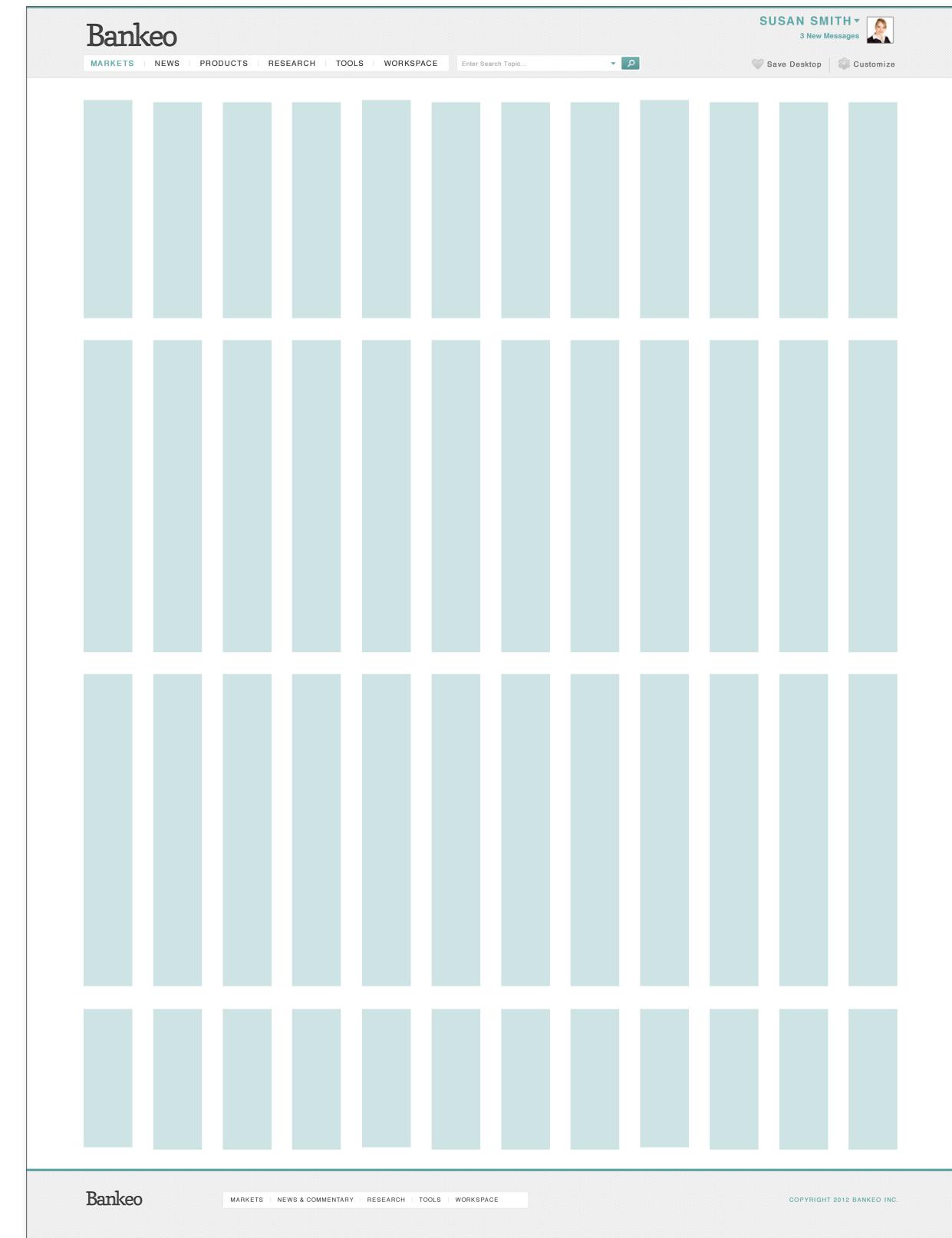
The F2 standard outlines a consistent HTML structure and CSS classname convention so neither Container developers nor App developers have to think about harmonizing look and feel. Container providers can create a customized stylesheet, and the selectors and declarations they define in CSS will cascade to their containers' Apps. Separately, Apps can define a preferred resolution (in grid widths) for Containers to position them appropriately within the grid.

Common Elements

From menus to buttons, typeahead to tooltips, F2 offers a means of developing a host of common UI elements. Additionally, the F2 spec supports a plugin infrastructure, so F2 can be infinitely extended as needs arise.

The Store

The Container owner is responsible for licensing the Apps and the content that they want to use. It is also the Container owner's decision whether or not to have an F2 store which is designed to sell content or apps to users. If the Container has an F2 store, the firm in charge of the store needs to ensure that entitlements are only turned on for paying customers, and that the App developers and Container owners get their share of the revenue, as negotiated.



A flexible 12-column grid system makes it possible for app developers to code once, using a responsive design approach, and still create an integrated, custom look and feel for each Container using the open framework.

Problem solved

Several fundamental problems are common to the financial services industry. Everyone is looking for ways to solve them quickly and efficiently.

Industry Problem	Description	F2 Solution
Monolithic Systems	Monolithic, installed code bases that are closed and expensive to enhance. When a "redesign" occurs on this type of platform, it's usually a do-over, from the ground-up. Integration is difficult.	Nimble, modern use of internet-delivery with a multi-vendor approach. Standardized framework used by all parties. Cost-effective and shorter development cycles.
Big Bang	Big Bang approaches stifle innovation and require significant investment in the integration of legacy systems. Buy-in from many stakeholders is essential and difficult to manage. Entire platforms must be redeveloped in order to make cut-overs. There are more bugs and problems at launch and unhappy users.	In the F2 environment you will be able to compete on features. It is easy to progressively make changes, enhancements, onboard new applications, switch content providers with little risk and migrate users and tools to the platform gradually as time and resources allow. Containers may also host previous versions of websites and Apps to further simplify migration.
Single Channel	Separate projects, budgets and teams for web sites, tablets and hand-held devices.	The F2 specification describes how to develop one framework that can be managed to many devices.
Security	Security concerns are a major reason firms worry about switching vendors or to a new technology.	F2 can entitle Apps without passing sensitive client information to a third party App provider. This multi-provider solution is more secure and less vulnerable than single-provider solutions.
Over-provisioning	Over-provisioning of content happens frequently. It is expensive to pay for content that no one is using. This probably happens because it is difficult to manage and change entitlements.	The F2 spec makes it easy to turn on or off entitlements as often as may be required.



Effective responsive design becomes a reality when you adopt the F2 open-standard.

MOD's commitment

By shifting development efforts towards a common specification that allows for complete customization, everyone wins. Information providers, content owners, financial firms, media outlets, developers and technology owners.

Markit On Demand has already made a commitment to F2 by developing internal and client sites which conform to the specification.

Once you've made the decision to adopt the F2 open standard, you will be in complete control of all related choices - where the Container will be developed and hosted, which Apps to include and who will build them (if they don't exist already), the content sources, and the level of customization available to end-users. All web-based projects, large and small, can be served on the F2 framework that only needs to be developed one time.

The greater the participation in F2 the richer, smarter and more effective it will be as an industry-wide platform to help reduce labor, time to market and costs.

The F2 specification is publicly available at openf2.org.

Thank you for your interest in F2. For more information please contact:

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