

# Take Content and Applications Mobile Using Adobe GoLive CS2

## TABLE OF CONTENTS

1	Mobile Developer Benefits of Adobe GoLive CS2
2	A Museum Tour Guide in Your Pocket
2	Introducing Adobe GoLive CS2
3	The Mobile Market
7	The Mobile Landscape
9	The Mobile Content Development Landscape
13	Benefits of Using Adobe GoLive CS2 for Mobile Development
16	Looking Forward
18	Go Mobile with Adobe GoLive CS2
19	Resources and References for Mobile Developers

## Mobile Developer Benefits of Adobe GoLive CS2

As the number of software-driven mobile phones grows exponentially, the demand for mobile content is also increasing. Tremendous opportunity exists to enhance and evolve the role of mobile content. Adobe GoLive CS2 extends the traditional strength of Adobe in print and web publishing to the mobile world. Using globally-adopted open standards, GoLive CS2 enables you to make mobile a manageable step, rather than a torturous trudge; by leveraging existing content elements, mobile content can be created more easily, while maintaining a consistent look and feel.

This white paper offers an overview of the opportunity in mobile development and the role of Adobe GoLive CS2 in helping to create mobile content that will let you to capitalize on this growing opportunity.

By the time you have finished reading this white paper you will understand:

- ▣ The benefits of using Adobe GoLive CS2
- ▣ The mobile landscape and the various roles of the players in the mobile market, as well as how they relate to each other
- ▣ The mobile development environment
- ▣ The importance of open standards in mobile development
- ▣ How the features of Adobe GoLive CS2 address the specific needs of the mobile development environment
- ▣ The future direction of the mobile market
- ▣ Where you can find specific mobile development resources online

This document is written for:

- ▣ Developers focusing on the mobile environment who would like to better understand the mobile-specific features of Adobe GoLive CS2
- ▣ Developers focusing on the wired web who are interested in understanding more about the market for mobile content and applications, mobile development and how GoLive CS2 can be used for mobile development
- ▣ Other decision-makers who need to understand more about the mobile content and application market, as well as the role of GoLive CS2 in mobile development

## A Museum Tour Guide in Your Pocket

*You made it! After much planning, you are taking a vacation in Paris to see the work of your favorite artist—the famous E. Topcliffe—at a special exhibition being held at the Louvre. You enter the museum, and while waiting in line, realize with a sinking heart that according to the poster near the ticket desk, you’ve just missed that morning’s guided tour. The ticket agent confirms this suspicion, gives you a ticket and then asks if you have a browser-enabled mobile phone. Wondering why, you cautiously respond that you do have a browser-enabled mobile phone with you. The ticket agent beams at you and says, “Wonderful, you are in luck! We have a new mobile virtual tour guide. Are you interested in purchasing access during your stay? It is 5 euros and can be used for seven days before the password expires.” After ensuring sure you have a handsfree earpiece with you, the ticket agent asks for your phone number and then sends a bookmark to your device via SMS (Short Message Service).*

*Once inside, you open the SMS and launch the browser using the bookmark. The bookmarked URL includes the virtual tour guide site address as well as an argument that automatically signs you in with your username and password. You select the E. Topcliffe exhibit and a map of the museum directs you to the room housing the exhibition. As you walk through the various rooms, you select the appropriate link for each one, and see yourself as a small dot on the floor plan shown on screen. Once you have arrived, you can open a second map that shows each work’s location within the exhibition. An additional “info” menu item also takes you to a description of the exhibition and a brief overview of wood and mixed media, as well as the post-constructivism movement. As you move from painting to painting, you can use your phone to get more background information on each piece, as well as recommendations of other similar works. Sometimes the information is a short video of an art historian, other times, it is a copy of a letter the artist wrote to his agent. When available, posters and other reproductions for sale in the gift shop are highlighted. Clicking on a favorite relief opens a virtual gift shop site that allows you to input in your credit card number and purchase a poster that is mailed to your home address.*

*The exhibition is organized chronologically, but you are more interested in the theme of excavation in E. Topcliffe’s work, and the personal tour guide application suggests various works that focus on this theme and marks their locations on the map. After a few hours of browsing, you find that you are starving and the main menu of the personal tour guide gives you a listing of nearby restaurants, with links to their menus. You leave the museum satisfied and feeling as if you have spent several hours with an art historian with a PhD in the works of E. Topcliffe.*



“red” is one of E.Topcliffe’s works currently on display at the Louvre’s special exhibition on the enigmatic British artist. His mixed media reliefs have been shown at the Carabelle Contemporary Art Center in Florida and the Hackney Art Gallery and the Galleria Tata, both in London.

## Introducing Adobe GoLive CS2

The above scenario might sound like something out of a cross between Artforum International magazine and a science fiction novel, but all the technology to create a personal museum tour guide exists today. One key tool for taking information and applications mobile is Adobe GoLive CS2. Adobe GoLive has been a popular tool for creating web sites, and in its latest incarnation, Adobe delivers key functionality that brings the best of GoLive to mobile content. GoLive CS2 provides:

- ▣ Leverage the flexibility of open standards thanks to built-in support for the latest open mobile standards, including XHTML, CSS, SMIL, and SVG Tiny.
- ▣ Reuse existing design elements more efficiently because of tight integration between GoLive CS2 and other components in the Adobe Creative Suite, including Adobe Photoshop®, Illustrator®, and InDesign® software.
- ▣ Extend out-of-the-box functionality through the GoLive SDK (software development kit) for maximum adaptability and productivity

GoLive CS2 gives you one visual design and development environment for both wired web and mobile content applications .

### Leverage the flexibility of open standards

One very real concern about going mobile is identifying the best way for transforming non-mobile applications and data to mobile formats. Enterprises fear investing time, energy, and resources just to find out that they somehow bet on the wrong technology and are now locked into a proprietary technology and toolset that no one wants, uses, or supports. Open standards solve this problem and avoid the need to bet on, and invest in, which proprietary technologies may become prevalent. Instead of trying to handicap the market approach of vendor A versus that of vendor B, open standards let you develop solutions that work smoothly across multiple vendors and products, and profit regardless of which technology dominates in the end. Adobe GoLive CS2 supports all the major open standards, including native support for standards from the W3C, OMA, 3GPP and 3GPP2, so you can be confident that the mobile content you create will integrate tightly and work on the majority of mobile clients. Once you have created your open-standards based code, GoLive CS2 can validate your code syntax.

### Reuse existing design elements

While creation can be invigorating and rewarding, *recreation* is significantly less thrilling. For those who would rather not reinvent the wheel, GoLive CS2 enables you to leverage existing web content you have worked with in GoLive, print content you have formatted in InDesign and graphic design elements from other Adobe applications, such as Illustrator or Photoshop. Previously, mobile incarnations of web or print content required that you recreate design elements in mobile-specific formats, such as WBMP, or recode huge swaths of HTML into another markup language. More recently, mobile browsers have evolved and can support some web formats, such as HTML, JPEG and GIF. This evolution, combined with the ability to reuse your existing source material in GoLive CS2, helps you save time and energy, as well as maintain a consistent look and feel—a critical element of successful branding and image management.

Figure 1. Screenshot of Adobe GoLive CS2?

### Extend out-of-the-box functionality

GoLive CS2 also enables you, via the GoLive SDK, to create extensions or plug-ins that connect GoLive to other applications, and extend the out-of-the-box functionality of GoLive CS2. The Adobe web site hosts a catalog of existing extensions that have already been created by other users, many of them freely available (see <http://www.share.studio.adobe.com>). If you can't find the extension or plug-in you need, you can use the XML and ECMAScript-based environment of the GoLive SDK to write your own. By offering a free GoLive SDK as well as a catalog of existing extensions, Adobe has created an application that supports emerging standards and can be tailored to your specific needs.

## The Mobile Market

The flexibility of the Adobe GoLive CS2 open standards-based approach, the ability to reuse existing design elements, and the extensibility of the GoLive SDK, are features targeted directly the needs of mobile developers. Before beginning to create mobile applications or content, however, you need more than just the right tools. To be successful in developing mobile content and applications, you need to consider the trends driving mobility, as well as the specific needs,

preferences and desired features of your future users.

### Mobile Trends

A few key trends are driving mobility.

- ▣ **Increasing mobility expectations.** No market is immune from increasing expectations. We've become accustomed to accessing e-mail, databases, and the Internet from work, from home, from the airport, from a hotel and even from our favorite coffee shop. The increasing penetration has led to higher expectations of availability. Being truly unavailable is becoming increasingly rare.
- ▣ **Productivity, competition and turnaround pressures.** Organizations and individuals are looking to squeeze the last bits of productivity out of each day and decrease turnaround times. There are fewer new customers to be had; so increasing service levels in order to drive loyalty is critical. Mobile access to applications, data, and messaging can increase employee productivity and nurture customer intimacy.
- ▣ **Access to data, regardless of network.** Traveling to another country, or sometimes even another town can present PC connectivity problems. Some hotels use digital phone systems that frustrate traditional dialup technology, and even in-room ethernet access can present problems when it comes to sending e-mail or gaining VPN access. Access to wireless data via mobile phones, however will work over any network, anywhere in the world.

### Mobile users

When many of us think of our mobile phones, we think of the kinds of tasks we currently use them for, as individual consumers. Consumers are sending SMS and MMS (Multimedia Messaging Service) messages, playing games, downloading ring tones and wallpaper and, of course, making voice calls. Many are using the personal information management (PIM) features, such as address book and calendar applications. Some are browsing web sites and taking and sending pictures with an integrated camera. In short, consumers want to have access to critical personal data, as well as entertainment.

Figure 2. Stock photo of happy people using a mobile device (but not talking on it)??

Some consumer products companies view mobile content as a marketing bonanza. For example, users who choose to receive updates and special offerings from their favorite brands can also choose to have MMS messages sent to their phones. Opt-in MMS messaging then allows the company to push information directly to consumers, including personalized greetings, product availability dates, animations of their products in action, as well as special mobile coupons. In Europe, where mobile marketing has a foothold, market researcher Forrester Research said that 32% of the Western and Eastern European companies that participated in a recent survey about marketing methods have adopted SMS for their marketing campaigns. Furthermore in 2004, spending on mobile campaigns is higher than spending on traditional e-mail campaigns.

Media companies are also striving to capture mindshare and see mobile content as a key tactic for promoting their brands. Users can subscribe to services, often through their wireless carrier, to receive push alert notifications about news, weather, traffic, sports and entertainment.

Savvy enterprises, on the other hand, look at mobility and see a world of efficiency and responsiveness. Researcher Strategy Analytics estimates that by the end of 2004 there will be about 421 million business wireless users worldwide, growing to 537 million by the close of 2009. Enterprises are looking to keep their data close to their employees, and their employees close to their customers. The February 2004 issue of *CIO (CIO Magazine)*, "The Payoff of Wireless IT Investments," February 2, 2004 reported on the primary business reasons cited by U.S. IT (information technology) executives for implementing wireless. Seventy-three percent cited increases in productivity; sixty-two percent were motivated by increases in efficiency, and 60% said there was demand and interest from their internal users. A study conducted by the University of Southern California (Center for Telecom Management at the University of Southern California, The Mobile Wireless Outlook Report, *What Lies Ahead: Customers' Requirements in Demanding Times*, January 2003) projected the use of wireless access in corporate environments. Messaging was by far the most highly rated activity at 43%, while sales force automation was close behind with a 38% importance rating. Intranet access came in at 34%, followed by a 31% tie between logistics/transport coordination and CRM (customer relationship management). Bringing up the rear were inventory management (30%), supply chain management (25%) and enterprise resource planning (20%).

Figure 3. Stock photo of some hardhat guy using phone but not talking on it or a graph of the USC data??

Several industries are particularly well suited to reap the benefits of mobile. Some of these industries include:

- ▣ **Field Service.** Mobile solutions are ideal for providing workers in the field with information, as well as enabling them to communicate with the home office without having to physically leave their location. For example, service technicians can now access information about equipment, look up inventory status at different locations, place orders and update tickets, all while on-site. Field service workers could then view animations that show how to replace a part or dismantle a machine, or even identify a given part based on an image of that part, rather than by the part's SKU.
- ▣ **Healthcare.** Healthcare is slowly starting to mobilize certain processes. Patient records must be constantly updated to ensure proper treatment of patients, especially in situations where multiple providers are caring for a single patient during a hospital stay. Using mobile devices to quickly update and retrieve the master patient records, caregivers can ensure they are accurate and secure. Additionally, having an electronic record makes consultation with remote specialists and primary care physicians much easier, as well as avoiding issues caused by difficult-to-decipher handwriting. Pharmaceutical tools can also be used to reference the latest drug choices and protect patients from potentially harmful drug combinations.

▣ **Construction.** A loud, dusty and ever-changing work site does not always make the best place for toting large references or delicate documents. By using rugged mobile devices to communicate with workers and send vital information from the field office, construction projects can move along more quickly and mistakes can be avoided.

#### The mobile market opportunity

It is not particularly revolutionary to say that the total mobile market is big and growing, but just how big is it and how fast is it growing? According to researcher IDC, there were 1.3 billion wireless subscribers (individual consumers and business users combined) in 2003, and that number is projected to rise to 2 billion by the end of 2008. All of these subscribers need a device to access their wireless services, and IDC believes that 539 million mobile phones were shipped in 2003. Annual mobile phone shipments are predicted to rise to 945 million by the end of 2008 (IDC, *Worldwide Mobile Phone 2004-2008 Forecast Update*, IDC #31640, August 2004).

The emerging subsection of the mobile handset market is the smartphone, or converged mobile device category. These devices are capable of running native software applications and in addition to voice capabilities, also offer personal information management features. Converged mobile devices, according to IDC, shipped 9.4 million units worldwide in 2003 and this figure is expected to jump to about 94 million by the close of 2008 (IDC, *Worldwide Smart Handheld Device 2004-2008 Forecast Update: First Quarter Triggers Downward Revision*, IDC #31554, August 2004). While smartphones make up a relatively small portion of the global market, these complex, data-driven devices are expected to penetrate into the enterprise market.

Figure 4. A graph or chart of Strategy Analytics data below? or a mobile map sort of graphic?

When considering mobile applications and mobile content, however, it is vital to remember that dynamic mobile content is not limited to the relatively small smartphone segment. Any phone with a browser and the right service plan can access rich mobile content anywhere today, and it is this expanded segment of the market (often referred to as the feature phone segment) that is being targeted by rich mobile content. In fact, market watcher Strategy Analytics believes that by the end of 2004, revenues from mobile data will reach \$61 billion and grow to just over \$189 billion in 2009. This 2009 revenue estimate will break down into communication (46%), entertainment (28%), and information (13%), with the remainder falling into the category of personalization and corporate connect, according to Strategy Analytics.

The mobile market, while vast and global, is hardly monolithic. Mobile has developed differently in each region and while these regional differences are shrinking, they are doing so slowly and are not likely to disappear completely. For example, while the U.S. has traditionally been at the forefront of new technology adoption, in the mobile arena it lags Europe somewhat and Asia more dramatically. Adoption is not the only area of regional variation. Europe—and to a lesser degree, the U.S.—have tended to favor a more open standards-oriented approach to mobile. Asia (more specifically, Japan), on the other hand, has traditionally adopted more proprietary solutions, although today Asia is moving more towards a combination of open standards and proprietary solutions. The open standards vs. proprietary solutions divide is expected to take longer to resolve. When developing mobile applications, it is critical to be aware of these regional quirks and the impact that they may have on mobile architecture and development.

## The Mobile Landscape

Once you understand the key trends driving mobility, the various users and their specific needs, as well as the scale of the potential market that you are targeting, it would seem that you are ready to start building your solution. The mobile market value chain, however, is complex and highly interrelated. In order to ensure that your application and content will be available to your target audience and function on the highest number of potential devices, it is critical to have a working knowledge of the role of each player in the mobile value chain.

### Operators

Typically, in order to use a mobile phone, you must first select a mobile service provider, such as Vodafone, Verizon, or Orange. Some large operators, like Vodafone, exert a significant amount of power over handset specifications. In Europe, to compete more effectively against a market giant like Vodafone, some other operators, including T-Mobile, Orange, Telefonica, and TIM of Italy, have banded together to form a group called FreeMove alliance (<http://www.freemovealliance.com>) in order to wield a larger collective influence over handset manufacturers, and in part to balance out the power of Vodafone. Mobile operators also exercise a huge amount of influence in deciding which handsets are available for purchase at their stores as well as which ones will be offered for free or at a deep discount as contract signing incentives.

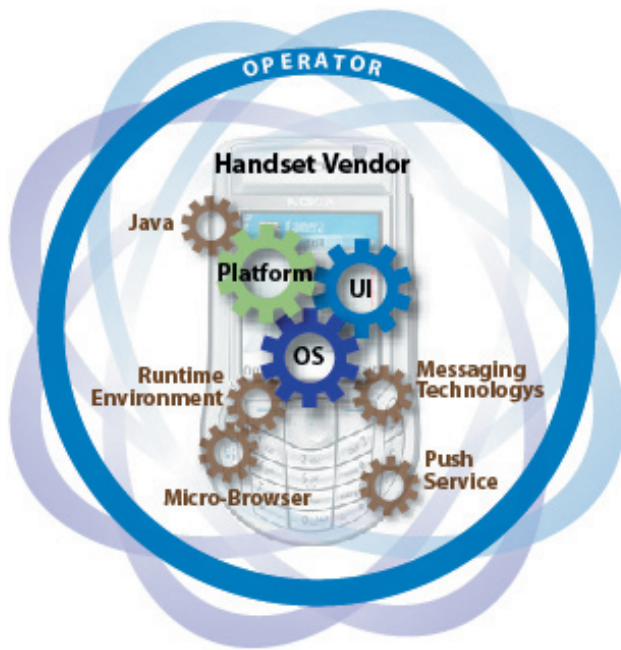


Figure 5. At each step of the mobile value chain, vendors are making choices about which of the other players they will work with, and which hardware, software and technologies they wish to support.

The first decision-making criteria for handset selection is compatibility with the type of network the operator runs. Currently there are two different generations of network technology in active use: second generation networks (2G) and third generation networks (3G). Outside Japan, 2G networks are based on either CDMA (Code Division Multiple Access) or GSM (Global System for Mobile Communications). GSM has been enhanced with additional data services that have been dubbed 2.5G technologies: GPRS (General Packet Radio Services), which boasts download speeds of 171 kbps, and EDGE (Enhanced Data Rates for GSM Evolution), which triples the download speed of GPRS. Almost all GSM operators have added GPRS services while a smaller number have adopted EDGE, opting instead to move directly to 3G networks. Operators running CDMA are primarily located in Asia-Pacific and the Americas, including Sprint, Verizon and Korea Telecom Freetel. Examples of operators using GSM plus GPRS are Vodafone, Telefonica Moviles and China Mobile, while operators using GSM plus EDGE include Cingular, Orange, TIM, T-Mobile and Hong Kong CSL.

3G networks have data rates of 384 kbps or more and are based on CDMA2000 or Wideband CDMA (WCDMA), which is often—and sometimes incorrectly—referred to as UMTS (Universal Mobile Telephone System). High Speed Downlink Packet Access (HSDPA) will increase data download speeds for WCDMA, much as EDGE as for GSM networks. CDMA2000 1xEV will likewise increase data transfer rates for CDMA2000. 3G's higher bandwidth opens the door for rich media applications such as video conferencing and streaming video. Much like GSM, WCDMA owns much of the European market. Operators using WCDMA include NTT DoCoMo, Hutchinson's "3", Sonera and Mobilkom. KDDI, Vesper, SK Telecom and Verizon are some of the operators using CDMA2000.

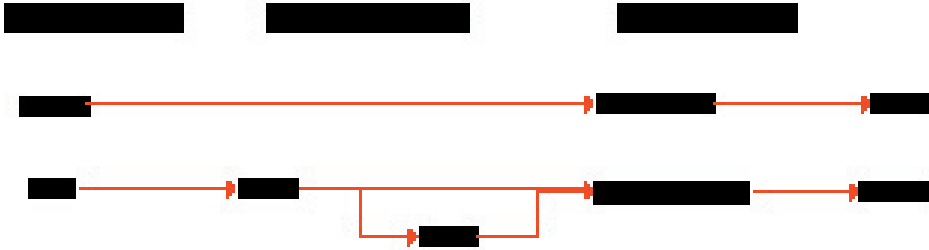


Figure 6. The two main paths of progression from 2G networks to 3G networks are illustrated above.

Radio frequency (i.e. 1900MHz and 900MHz) is another attribute that differs from region to region and, occasionally, from operator to operator. T-MobileUSA, for example, uses only 1900 MHz frequency, while Cingular uses 1900 MHz and 850MHz frequencies.

For mobile content developers, network differences have a minimal impact. The key issue is that higher bandwidth means increased demand and better performance for media-rich applications, so services requiring video streaming and the like are best suited for markets with 3G networks.

Once network compatibility has been established, operators offer phones that enable them to reach specific targeted demographics. The kind of phone that will appeal to a teenage girl is less likely to be attractive to her accountant father—and carriers seek both demographics.

Like any other business, operators are interested in finding ways to make the products and services they offer unique, as a way of differentiating themselves in the market. Choice of handset operating system, platform and natively supported technologies is one arena. Another key area of differentiation is mobile content. Virtually all operators offer a default mobile application portal and provide catalogs of applications and mobile web sites supported on their phones and network. Operators hope that you will become so attached to their brand of services that you will be less likely to switch to a competing carrier. In terms of getting a mobile application to market, operators overwhelmingly represent the largest channel.

#### Handset vendors

Next in the technology-influencing chain are handset vendors, such as Nokia, SonyEricsson, Samsung, and Motorola. Handset vendors invest tremendous amounts of R&D funds in creating phones designed to appeal to various demographics. While each handset vendor segments the market slightly differently, from a high-level perspective these demographics include youth/teenagers, basic (predominantly voice) users, data-using business users, and early adopters of new features and technologies. Inside the glossy covers, handset vendors also select which operating systems and platforms they will use, often on a handset-by-handset basis. For example, Nokia's low-end phones are driven by Nokia's in-house operating system, while their smartphones are powered by the Symbian OS-based Series 60 and 80 platforms.

#### Operating system vendors

Operating systems act as the traffic system of the device, determining which processes each piece of hardware or software can perform. Operating systems are arguably the biggest battleground in the smartphone space, with vendors such as Symbian, Microsoft, and Palmsource fighting for market share. Just like personal computers, operating system selection dictates what other technologies or software can coexist on the device. Some operating systems are proprietary systems, often owned by handset vendors, while others, such as Symbian, are licensed to multiple handset manufacturers. Currently, the majority of devices shipping today feature operating systems developed by the handset vendor, however the percentage of devices offering licensed operating systems, such as Symbian, is growing steadily.

## Platform vendors

As we look at the other components that make a mobile device function, the delineations and definitions become increasingly blurry because each vendor approaches the market slightly differently. All platforms sit on top of an operating system and provide a native runtime environment (as opposed to a separate, self-contained runtime environment like Java). Often platforms provide additional functionality such as APIs to drive cameras or messaging capabilities. Some platforms, like Microsoft's Smartphone platform, come with a very specific UI; others, like Nokia's popular Series 60, and Symbian's UIQ platform provide some core UI elements, but provide for a high degree of UI customization to address a number of form factors. Both platforms, however, run on top of the popular Symbian operating system. Microsoft offers two mobile platforms: the more handheld-device-oriented PocketPC platform and the phone-specific Microsoft Smartphone platform.

## Technology-enabling application vendors

Technology-enabling applications sit on top of the platform and tap into resources at all levels of the technology stack. Technology-enablers provide additional functionality not offered elsewhere. Some of the most popular are runtime environments, micro browsers, messaging clients, graphics engines, and audio engines.

- ▣ **Runtime environments.** Runtime environments provide an application execution environment for various non-native programming languages such as Java or Visual Basic. By adding a run time environment, you create a space to execute applications written in languages that are not supported by the hardware, operating system, or platform. Sun and IBM both produce runtime environments for Java, while AppForge makes a runtime environment for Visual Basic.
- ▣ **Micro browsers.** Micro browsers are applications that render markup languages and related data. Just as Microsoft's Internet Explorer, Mozilla Firefox or Opera enable you to see web content on a personal computer, micro browsers let you see mobile content on your phone or other mobile device. Micro browser vendors include Obigo, Openwave, Access Systems, and Opera.
- ▣ **Messaging clients.** Messaging clients let mobile users send, receive, view and edit messages including SMS, MMS and e-mail. Some popular messaging client vendors include Obigo, Openwave, and Access Systems.
- ▣ **Graphics and audio engines.** Graphics and audio engines provide the rendering capabilities for various media formats. For example, Ikivo and BitFlash/OpenText provide engines that let you view SVG Tiny, a subprofile of the full SVG specification. SVG (scalable vector graphics) is a widely-adopted open standard for data-driven interactive applications and device UI elements. Superscape provides an engine for 3D graphics, while Beatnik offers an engine for listening to audio files such as SP-MIDI and the proprietary .xmf format. RealPlayer and Quicktime Player can play recorded audio file formats, such as AMR, AAC, MP3. Additionally, video content in h.263 3GPP and MPEG-4 formats can be played back using client players such as PacketVideo pvPlayer, RealPlayer and Apple's Quicktime Player.

Often technology-enabling applications are competing against homegrown solutions from handset, operating system and platform vendors. For example, some handset vendors license micro browsers from browser vendors such as Openwave, while others use their own browsers.

## The Mobile Content Development Landscape

Armed with a strong working knowledge of the mobile market, now it is time to consider the tools you will be using to create your application or content. The good news is that mobile development does not require you to buy, learn and use an entirely new set of tools. Browser and messaging-based applications can be developed with the same Adobe Creative Suite products you are using today for your wired web content. Compound documents containing SMIL, SVG-t and XHTML elements, as well as CSS, can also be handled by GoLive CS2. For client-side development, most of the major IDEs, including Metrowerks' CodeWarrior and Borland's C++Builder, support the development of native C++ code that drives mobile applications, or have mobile-specific extensions. J2ME, the mobile version of Java, can be created in Borland's JBuilder or in Eclipse and XML can be handled by XML tools such as XMLSpy and Stylus Studio. Databases and middleware layers require little, if any, modification for servicing mobile users.

Once you have your core application engine completed, you can then use complementary mobile technologies to deliver a full-functioning solution. Let's go back to our personal museum tour guide application. This time you are the developer, not the end user. The back end database and middleware programming is completed and now you need to finish the application by tying together the existing engine with mobile-appropriate technologies.

### Local connectivity options

Local connectivity technologies are used for relatively short distance connections and are typically used for multiplayer gaming, proximity-based services, file transfer and application loading.

- ▣ **Bluetooth.** Bluetooth is a peer-to-peer connectivity technology that uses a short-range radio frequency and transmits up to 10 meters.
- ▣ **WiFi.** WiFi also uses short-range radio frequencies, but instead of a peer-to-peer paradigm, WiFi uses a one-to-many approach and typically acts as an access point to a network, either public or private.
- ▣ **InfraRed.** InfraRed uses line-of-sight to establish peer-to-peer connectivity.

*You select Bluetooth as your peer-to-peer connectivity. Bluetooth transmitters located throughout the Louvre communicate with mobile phones, enabling other technologies to display the user's location on a map within the application.*

### Markup languages

As in the wired web, there are different markup languages used to define the format of content. Most are based on traditional HTML or XML, or a combination of both.

- ▣ **HTML.** HTML is the base language of the web, and was defined by the W3C. An increasing number of mobile browsers are supporting full HTML 4.x or at least large subsets of the language, as browser vendors and the operators realize that consumers are demanding access to the majority of the existing Internet content. Frames are a notable exception in most of these cases.
- ▣ **XML.** eXtensible Markup Language is the preferred method of storing and transferring data, with each item tagged appropriately. Many markup languages are based on XML, which is defined by the W3C.
- ▣ **cHTML.** cHTML (Compact Hypertext Markup Language) is a subset of HTML that was defined by a consortium of Asian technology companies, including ACCESS, Fujitsu, Matsushita, Mitsubishi, NEC, and SONY, who jointly submitted the specification to the W3C, where it was accepted. cHTML is used for i-mode-based devices. It is an older markup language that is not widely used today.
- ▣ **XHTML.** XHTML is the XML-compliant version of HTML that was defined by the W3C. This language requires code to be well-formed according to XML rules and must be able to be parsed. XML compliance reduces the burden on the browser providing a smaller footprint and less memory consumption and XHTML is now a common format for both the wired and wireless web.
- ▣ **XHTML Mobile Profile.** XHTML Mobile Profile is the mobile subset of XHTML that was defined by the Open Mobile Alliance.
- ▣ **WML.** Wireless Markup Language was defined by the WAP Forum (now part of Open Mobile Alliance). This XML-based language was specifically designed for mobile devices and is still widely supported although functionally limited.

*Using the micro browser you can display the items available in the gift shop and purchase options, using XHTML Mobile Profile.*

### Presentation languages

These languages are specifically used for handling the look-and-feel of content.

- ▣ **CSS.** Cascading Style Sheets separate web content from its visual design elements, such as fonts, colors and layout. Stylesheets enable rapid changes across entire sites by defining visual design elements in a central file or files. The W3C has defined the

### The Evolution of WAP

The WAP Forum (now part of the Open Mobile Alliance) was created in the late 1990s by a number of companies who wanted to create interoperability standards for mobile browsing. The first specification, WAP 1.x was comprised of a host of mobile-specific technologies, such as WML for markup, and WML script as a client-side scripting language, WBMP as an image format, and a WAP stack for transport. All of these standards were created more or less from scratch and only had mobile applications. WAP 1.x was the mobile open standard, however, it was also quite strict in terms of implementation options, and not terribly intuitive. WAP 1.x was also very limiting in presentation options, and offered no style sheets, only one font, and limited table support.

WAP 2.x was created to offer a more compelling user experience and to give designers and users more options. In addition, WAP 2.x was focused on facilitating the migration of wired assets to wireless assets. As a result, WAP 2.x is comprised largely of mobile-specific versions of existing technologies, such as XHTML Mobile Profile for markup, a TCP/IP stack for transport, and support of .gif, .jpeg and .png image formats. In addition WAP 2.0 provides WAP CSS that can be used to optimize presentation for different devices, rather than coding from beginning to end for each device. The big drawback in WAP 2.0 is a lack of scripting language support for XHTML Mobile Profile files.

WAP 3.0 is expected to address the need for scripting through the use of XHTML-Basic and compound documents, which typically contain a mixture of technologies, such as XHTML with embedded SVG and XML and often use CSS or SMIL for the presentation layer. Many industry watchers believe that WAP 3.0 should work not to create mobile-specific silo specifications, but instead create a framework for wired-web content to more easily be taken mobile.

CSS specification.

- ▣ **WAP CSS.** WAP CSS is a subset of the standard CSS presentation language specifically for mobile applications using XHTML Mobile Profile. Like XHTML Mobile Profile, WAP CSS is defined by the Open Mobile Alliance.
- ▣ **SMIL.** Synchronized Multimedia Integration Language is an XML-based presentation language defined by the W3C. SMIL is used primarily for slide-show or time-based applications and is also the presentation language for MMS.

*You design the browser-based part of the application to mirror the look and feel of the Louvre's web site. CSS lets you to maintain a consistent look and feel, while GoLive CS2 enables you to pull in Photoshop graphics and InDesign text from the print E. Topcliffe brochure as needed. You add the option of sending a virtual postcard, and select SMIL to create a slideshow of images of E. Topcliffe's early work.*

## Messaging

Mobile networks and applications support several unique message formats, in addition to standard formats such as MIME e-mail.

- ▣ **MMS.** Multimedia Messaging Service enables you to package text, images, audio and other content and send it to users either from an application server or peer-to-peer via MMS Gateways in the operator networks. MMS is defined by 3GPP.
- ▣ **SMS.** Short Messaging Service lets you send brief text messages or small data files to users either from an application server or peer-to-peer via SMS Gateways in the operator networks.
- ▣ **WAP Push.** WAP Push messages are used primarily for devices that have a WAP stack (and not a TCP/IP stack) and can send information such as settings and URLs. Like the other WAP specifications, WAP Push is defined by the Open Mobile Alliance.

*The user receives all of the videos of interviews with E. Topcliffe himself and his contemporaries, and the images of his letters to his close associates via MMS, using peer-to-peer connectivity via MMS Gateway.*

## Multimedia formats

Audio and video capabilities on mobile devices are rapidly improving, although support for specific formats still varies across devices.

- ▣ **h.263 3GPP.** h.263 3GPP is a 3GPP-standard video format.
- ▣ **Adaptive Multi-Rate.** Adaptive Multi-Rate (AMR) is a standard audio format defined by 3GPP. There is a Narrow Band and Wide Band version of this format.
- ▣ **Enhanced Variable Rate Coder.** Enhanced Variable Rate Coder (EVRC) is a standard audio format that is part of the larger 3GPP2 specification and is widely used in CDMA networks.
- ▣ **MPEG-4.** MPEG-4 is a commonly supported audio and video format standardized by the Moving Picture Experts Group (<http://www.chiariglione.org/mpeg>)
- ▣ **Scalable Polyphonic MIDI.** SP-MIDI is an audio format that enables MIDI channels to be prioritized for playback on devices that may have a limited number of simultaneous instruments. SP-MIDI is defined by the Midi Manufacturers Association (<http://www.midi.org>).
- ▣ **SVG-t.** SVG (scalable vector graphics) is a widely-adopted open standard for data-driven interactive applications and device UI elements, and SVG-t (SVG Tiny) is a subprofile of the full SVG specification.

*SVG-t drives the location-based map that shows the layout of the museum and the location of the user. Rare interview clips are with Topcliffe are played back in the AMR audio format.*

## PDF Support on Mobile Devices

In August of 2002, the popular Adobe Acrobat Reader was released for devices running the Symbian operating system. This extension of PDF capabilities to the mobile world has enabled users of Symbian OS phones to bring PDF documents with them, wherever they went. Acrobat Reader for Symbian OS enables users to read, navigate, and search Adobe PDF documents (including those that have been password protected), either in their original format or re-flowed to fit the width of a wireless device screen. Since the initial availability of Adobe Acrobat Reader for Symbian OS, a number of handset vendors have begun shipping some of their handsets with out-of-the-box PDF support.

## Compound documents

Compound documents are the future of mobile content. Compound documents enable you to create rich client solutions. Compound documents often contain a mixture of technologies, such as XHTML with embedded SVG and XML and often use CSS or SMIL for the presentation layer. The key benefit of compound documents is that they can be rendered within a microbrowser, and do not require any other software in order to be viewed.

*You decide to use compound documents to let users to click on any part of an SVG image of a work of art to see closer detail, with XHTML text noting medium, date and title of work.*

## MIDP J2ME

Mobile Information Device Profile Java 2 Micro Edition is the mobile version of client-side Java. This is a subset of the J2SE specification with significant mobile-specific additions. A KVM (Kilobyte Virtual Machine) is required to run these applications on the client.

- **JSRs/APIs.** Additions to the MIDP J2ME specifications are implemented using Java Specification Requests that typically define new APIs. These APIs enable MIDP Java applications (MIDlets) to extend beyond the KVM “sandbox” and utilize phone features and functions. JSR-226, for example, enables MIDlets to render SVG-t content, while JSR-184 enables the rendering of 3D graphics.

*You create a MIDlet game to complement the exhibit tour guide. Using JSF-184, it is a 3-D puzzle game based on the wood layering of Topcliffe’s work.*

## Security and privacy

One of the significant inhibitors of location based services and wide distribution of mobile content are the inherent issues around individual privacy and ownership rights. Content owners and creators want to protect their products from devaluation through easy redistribution and piracy, while individuals want to safeguard their personal information and ensure that their mobile transactions are secure.

- **Open Mobile Alliance Digital Rights Management.** Open Mobile Alliance Digital Rights Management (OMA DRM) is the industry standard for mobile content protection, created by the OMA. OMA DRM is an device-specific open standard, and is used to protect content and applications from piracy. There are several different options for protecting content in version 1.0, such as Forward Lock and Combined and Separate Delivery, which are widely supported. Version 2.0 provides a more robust security model, including third party authentication, and will be coming to market in the near term. According to market watcher Baskerville, over 100 million mobile phones supporting OMA DRM are expected to ship during 2005.
- **The Liberty Alliance.** The Liberty Alliance is a standards body focused on the technical, business, and policy issues surrounding identity and web services. It creates open technology specifications and provides Liberty Interoperable Certifications that allow individuals to authenticate their own identity as well as the identity of any party they may interact with via a mobile device

*The video clips sent to devices, at the Louvre’s insistence must be protected using OMA DRM in order to prevent users from sharing with others and to ensure the 7-day expiration.*

## Location-based services

Location-based services enable applications to use the end-user’s present location to enhance their offerings. GPS and cell-ID are two methods for providing this information.

*Once the browser is launched to find a nearby restaurant, GPS shows restaurant locations on a local map, as well as providing walking directions to various local destinations.*

## Financial Benefits of GoLive

GoLive clearly addresses many of the challenges of mobile development, including an ever-tightening IT budget. By selecting GoLive, you can use one tool to create web and mobile solutions, instead of buying and learning an entirely new toolset just to go mobile. The ability to leverage existing content for your mobile solution saves both time and money, while the ability to reuse design elements also leads to shorter project times and a cross-media user experience. GoLive helps you get to the “big bang” of mobile with a much smaller investment of work and time. Additionally, the Creative Suite Premium bundle provides even more value, combining essential tools such as Photoshop, Illustrator, and Acrobat with GoLive at a competitive price.



Figure 7. Application engines using C++, Java or back-end database technologies can be pulled into GoLive. Once in GoLive, you can take advantage of all of the markup, presentation, messaging and other tools. From within GoLive, you can also select the same elements from print or web content and bring them into a mobile framework.

## Benefits of Using Adobe GoLive CS2 for Mobile Development

Think of IDEs as the machinist's development shop. Whether you are building a microcar engine or an airplane engine, you still need the space, tools, machines, materials and fasteners to put together a working engine. Once your engine is finished, you need to add in all of the other elements that turn it into a car, boat, or airplane. You can do some of these things in the machine shop, however it is really more for creating engines than chassis or wings. You probably won't have the right tools or materials on hand in the machinist's shop either.

Completing an application is much the same. Once the core application engine is completed, it is still necessary to layer on all of the supporting technologies in order to enable the application to interact with the device hardware and software, and to let users interact with your application. Development IDEs are optimized for the nitty gritty development work, but they don't have all the content editors and presentation utilities necessary. GoLive CS2 is the ideal solution for completing mobile applications.

In the above metaphor, GoLive CS2 is the high-end body shop next door to the machine shop. In this body shop, you can select a chassis, a body shape, wings or wheels, steering wheel or rudder. You have all the hammers, sanders, and high pressure paint guns you need to turn your naked

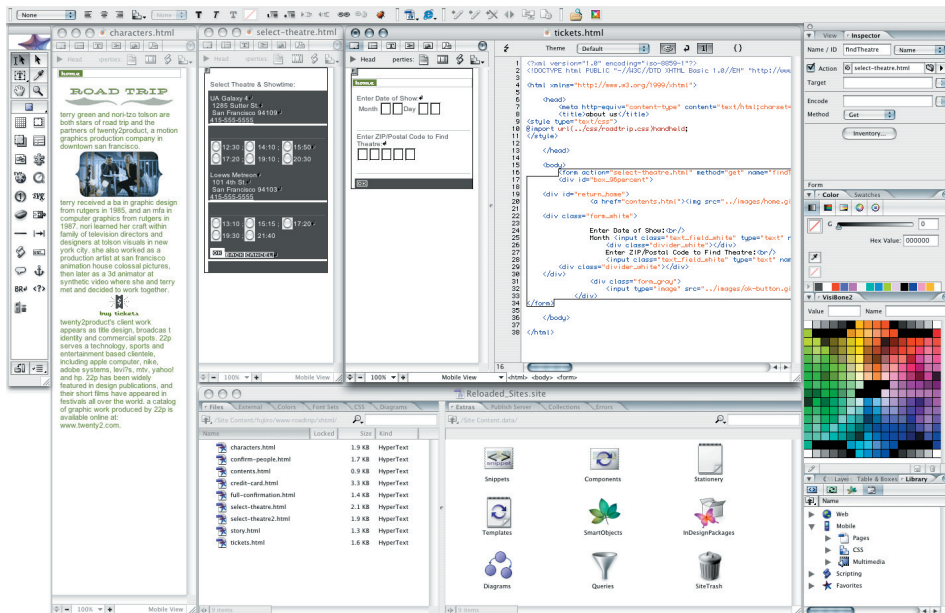


Figure 8. Using the Objects palette, you can easily drag-n-drop elements into an XHTML Basic, or XHTML Mobile Profile file to create a mobile-ready form. This example shows an XHTML Basic page, called Tickets.html, being created to help users easily find, select, and purchase movie tickets through a mobile phone.

engine into a functioning mode of transportation. You can assemble your car, install comfortable seats, add in heat or cooling, and polish and paint the outside. Without the GoLive CS2 body shop, you'd be dragging your engine from the machine shop to the metal shop, to the window place, to the upholsterers, and to the paint shop.

GoLive CS2 gives you one place to build your web interface and finish your application. It supports all the major functionality that a mobile application may need, freeing you to focus on what you want your application to do, not how to do it.

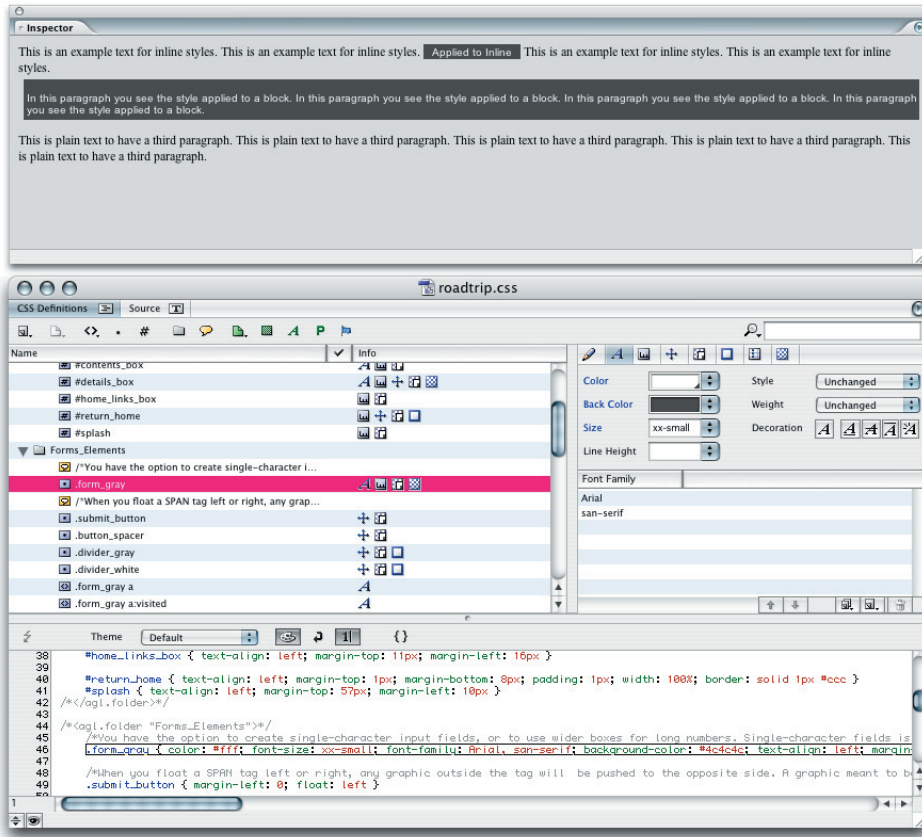


Figure 9. The CSS Editor lets you to visually define styles and positioning of content elements. In this example, we're using a CSS class called ".form\_gray" to lay out the tickets.html page in CSS.

## Planning a Night Out While On The Go

*In our second practical example, GoLive CS2 enables the creation of a mobile movie ticketing application. This application features a mobile browser web interface for viewing information about current films choices, available showtimes and locations. You can also purchase tickets using your mobile device. The application is created using GoLive CS2 features including drag-and-drop XHTML Mobile Profile elements and the visual CSS editor.*

### Author presentation languages visually

GoLive CS2 extends visual authoring to include support for CSS level 1,2 and Mobile profiles. As with authoring of markup languages, GoLive CS2 provides an integrated layout and source view, as well as code validation and code completion. To ease the challenge of going mobile, GoLive CS2 enables you to convert web-based projects into mobile baseline sites, converting XHTML to XHTML Mobile Profile, or HTML to XHTML.

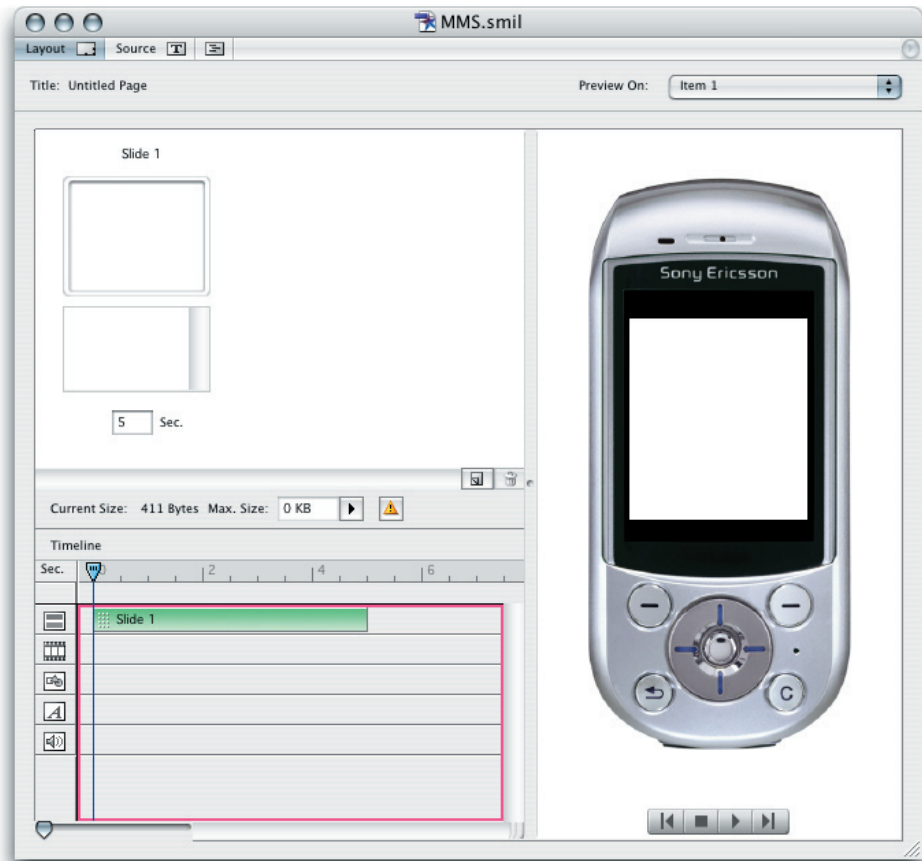


Figure 10. Using the MMS editor, you can visually create SMIL files by setting slide elements and timers, as well as being able to preview content on device simulators.

### Native support for messaging development

GoLive CS2 enables you to create interactive SMIL and MMS messaging applications using an object-based timeline interface. Visual authoring and layout mode supports SMIL 1.0, SMIL 2.0 and MMS. As with presentation language and markup language authoring, GoLive CS2 supports syntax checking, debugging, and validation for SMIL 1.0, 2.0, and also SMIL 2.0 3GPP profile. SMIL messages can also be converted to the MMS format. By using SMIL, you can pull together graphics files of multiple formats.

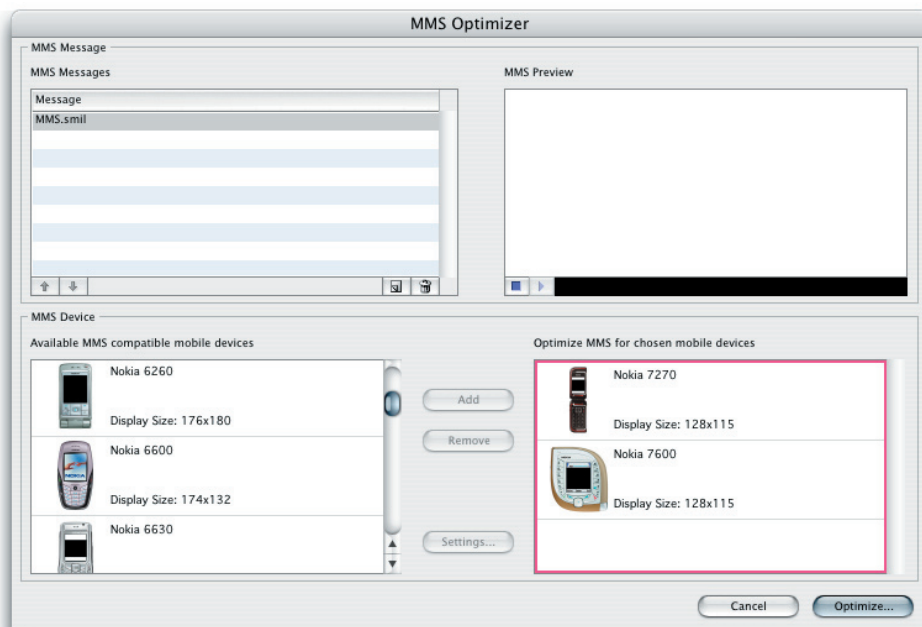
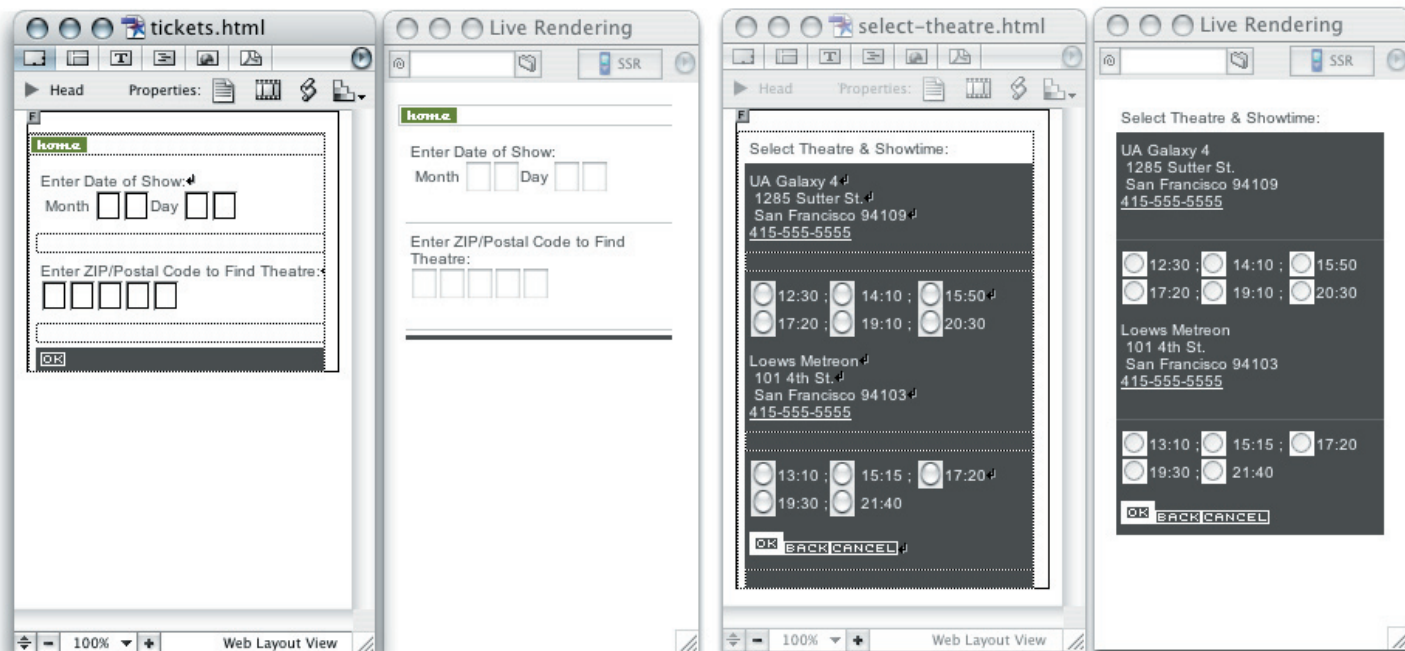


Figure 11. The MMS Optimizer gives users the opportunity to preview MMS content on multiple device simulators and optimize the presentation for each device.

One popular use of MMS is to create multimedia postcards to promote events and entertainment events, or as a method for “pushing” information on a subscription bases . Using GoLive CS2, you can apply finite controls such as timing and duration and work with images, text, sound, and mobile video (SVG and 3GPP) to create a stunning MMS presentation. GoLive CS2 facilitates the creation of galleries of images, sounds and templates that you use repetitively.

GoLive CS2 also lets users ensure optimal presentation of MMS messages on different devices using the MMS Optimizer feature. This is essential for perfecting MMS content given the discrepancies in screen sizes, image support and SMIL support on different devices.



**Figure 12**  
Throughout the content design and development process, you can quickly preview your content in both a standard browser and in Small Screen Rendering view, all within the GoLive environment. In this example, you can see how the theatre location page will render within a web browser and on a mobile phone browser using the Opera thin-client engine.

### Optimize for specific devices

Once you’ve developed content, it is important to test how it visually appears on various devices. GoLive CS2 lets you to select the devices for which you are authoring and then batch process MMS content to optimize it for each device in the queue. Additionally, GoLive CS2 provides onboard phone skins and device profiles from SonyEricsson, Nokia, and ACCESS to be used for device emulation.

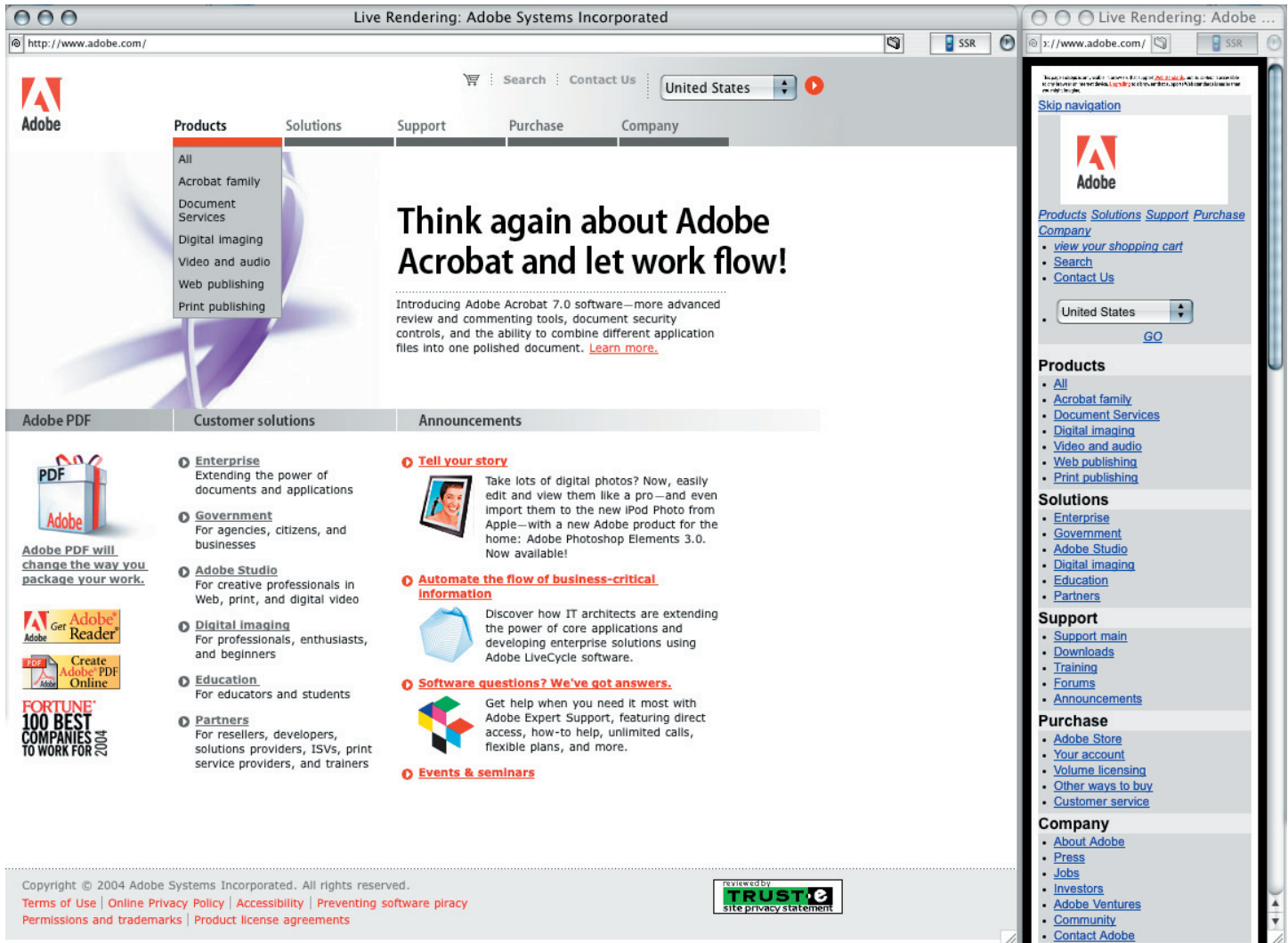
## Looking Forward

Just as you cannot safely drive a car by looking only in the rearview mirror, you cannot successfully develop an application or content solution without looking at what the future may hold. In order to avoid re-architecting an entire solution to meet the latest market demands, it is helpful to have a sense of how the market may change in the future so you can take those possibilities into account today. In addition, it is important to select tools that will grow with you and allow you to take advantage of new technologies as they come to market. New specifications and features are being defined constantly, network operators continue to push for new functionality to separate their offerings from the pack, and the processor speed and memory arms race has struck mobile devices in the same way it has the world of the personal computer.

Here are some of the trends to watch and begin creating implementation scenarios for:

### Improved multimedia data capture

Camera phones are immensely popular with all types of users, so vendors are constantly increasing camera resolution, features and media storage and management capabilities. Video capture is also already available on some models and that quality is also escalating exponentially. Improved audio capture will also accompany the visual enhancements. Devices are likewise improving their multimedia playback and supported content types and live video conferencing is already on the market in its early stages.



**Figure 13**  
This example of the small screen rendering feature provides a side-by-side view of the traditional web page presentation on the left and how the page would render on a mobile device on the right. As bandwidth increases, users will expect all web sites to render appropriately on mobile devices.

### Richer content presentation

While most early mobile efforts centered around creating completely separate mobile content offerings, consumers and enterprises have spoken and are demanding access to the full Internet. Many browsers can now render the majority of web sites, so the web designers who create CSS-based sites that account for mobile browsers will greatly benefit in this regard. The Small Screen Rendering capabilities of GoLive CS2 give you the ability to easily see how your traditional web site will render in a full-featured microbrowser, making the migration to mobile one step closer.

### Increased security

As corporate usage increases, enterprises are demanding that mobile devices are at least as secure as their laptops. Virtual Private Network solutions, fingerprint- and iris-based application unlocking and other frameworks are evolving to meet this demand.

### Widening of the pipe

3G networks, EDGE networks and the networks that will follow them are creating additional bandwidth for data transfer, which is creating greater demand for high-quality content that is optimized for smaller presentation on device displays.

### Device-based content creation

Mobile blogging, or moblogging, is already being used by early adopters, and as more users have cameras and camcorders embedded in their mobile, users will want to share their content through various publishing models.

### Location, location, location

Location-based services are still in their infancy, in part due to resistance by users with privacy concerns who don't want their whereabouts to be freely broadcast. Vendors and service providers are addressing these concerns by making location-based applications something a user must activate, rather than a passive default setting. As user activation and other safeguards begin to address key privacy concerns, and as users become more comfortable with the benefits of location- and presence-based services, demand for these kinds of applications and services are expected to grow.

### Remote device management

Enterprises who roll out mobile applications to their workforce are demanding the ability to manage and provision the applications that reside on their employees' devices. Look for IT staff to be updating software to users off-site and monitoring what applications they have installed on company-owned devices.

### Mobile television

Several efforts are already underway, and in Asia this feature is extremely popular. As users gain the ability to watch broadcast-quality television, the winning applications will leverage this behavior for adding value and generating revenue opportunities.

## Go Mobile with Adobe GoLive CS2

It is clear that the opportunity for mobile content and applications is growing rapidly. With its focus on open standards, extensibility, and the tight integration with the rest of the award-winning Adobe product line, GoLive CS2 is the smart choice for going mobile. The GoLive dedication to open standards ensures that you can grow and evolve your content and applications as the market develops. The GoLive SDK allows you to take advantage of the latest technologies without waiting for the next release, ensuring that you will be on the forefront of the mobile revolution. The tight integration of GoLive CS2 with the rest of the Adobe product line makes the transition to mobile from print or wired web content smoother and simpler. No other product has the versatility, commitment to open standards, and tight integration with market-leading tools, and these traits make GoLive CS2 the clear choice for mobile development.

## Resources and References for Mobile Developers

### Hardware Vendors

- ❏ **Motocoder** (<http://motocoder.com>). Tools, SDKs and documents for Motorola devices and related technologies, including browsing, messaging and MIDP J2ME applications. Free registration required for access to some resources. Paid support also available.
- ❏ **Forum Nokia** (<http://forum.nokia.com>). Tools, SDKs and documents for all Nokia devices and related technologies, including browsing, messaging, MIDP J2ME and native Symbian C++ applications. Free registration required for access to some resources. Discussion boards and paid support also available.
- ❏ **Sendo** (<http://sendo.com/dev/index.asp>). Tools, SDKs and documents for Sendo X and other devices and related technologies, including MIDP J2ME and native Symbian C++ applications. Free registration required for access to resources.
- ❏ **Siemens Mobile** (<http://www.siemens-mobile.com/developer>). Tools, SDKs and documents for Siemens Mobile devices and related technologies, including browsing, messaging, MIDP J2ME and native Symbian C++ applications. Free registration required for access to all resources. Discussion boards also available.
- ❏ **SonyEricsson** (<http://developer.sonyericsson.com>). Tools, SDKs and documents for SonyEricsson devices and related technologies, including browsing, messaging, MIDP J2ME and native Symbian C++ applications. Free registration required for access to some resources. Discussion boards and paid support also available.

Inline graphics can extend to the full 3 column

### Platform and Technology Vendors

- ❏ **Access** (<http://www.access.co.jp/products/nf.html>). SDK and documentation for the NetFront mobile browser.
- ❏ **Beatware** (<http://www.beatware.com>). Tools and documentation for creating SVG Tiny thin-client content.
- ❏ **Blackberry** (<http://www.blackberry.com/developers/index.shtml>). Tools, SDKs and documents for devices running the Blackberry software and related technologies, including browsing, MIDP J2ME and native C++ applications. Discussion boards also available.
- ❏ **Ikivo** (<http://www.ikivo.com>), formerly ZoomOn. Authoring tools and documentation for devices enabled with SVG Tiny thin-client capabilities.
- ❏ **Microsoft** (<http://msdn.microsoft.com/mobility>). Tools, SDKs and documents for devices running Windows Mobile, PocketPC and WindowsCE software. Forums and paid technical support also available.
- ❏ **Openwave** (<http://developer.openwave.com>). Tools, SDKs and documents for devices running Openwave software for browsing and messaging. Free registration required for access to some resources. Discussion boards and e-mail support also available.
- ❏ **Opera** (<http://www.opera.com/products/mobile/dev>). Information about how to improve an HTML site, create a CSS-based site with multiple views, and create a mobile portal.
- ❏ **PalmSource** (<http://www.palmsource.com/developers>). Tools, SDKs and documents for devices running the PalmOS software and related technologies, including browsing, MIDP J2ME and native C++ applications. Free registration required for access to some resources. Discussion boards and paid technical support also available.
- ❏ **Qualcomm** ([http://brew.qualcomm.com/brew/en/developer/resources/dev\\_resources.html](http://brew.qualcomm.com/brew/en/developer/resources/dev_resources.html)). Tools, SDKs and documents for devices running the BREW software. Discussion boards and e-mail support for qualified developers also available.
- ❏ **Series 60** (<http://series60.com/developers>). Tools, SDKs and documents for Series 60-based devices and related technologies, including browsing, messaging and MIDP J2ME applications.
- ❏ **Sun Microsystems** (<http://developer.sun.com/techtoc/mobility>). Tools, SDKs and documents for devices running MIDP J2ME software. Discussion boards also available.

- ❏ **Symbian** (<http://www.symbian.com/developer>). Tools, SDKs and documents for Symbian-based devices and related technologies, including MIDP J2ME and native Symbian C++ applications. Free registration required for access to resources.
- ❏ **UIQ** (<http://www.uiq.com/developer>). Tools and documents for creating applications and services for mobile phones that incorporate the UIQ platform.

#### Enterprise Software Vendors

- ❏ **IBM** (<http://www.ibm.com/developerworks/wireless>). Articles, tutorials and forums on mobile development using IBM client and server technology.
- ❏ **Oracle** (<http://www.oracle.com/technology/tech/wireless>). Documents, tutorials, downloads and forums on mobile development using Oracle technology.

#### Independent Developer Sites

- ❏ **All About Symbian** (<http://www.allaboutsymbian.com/develop>). Articles and tutorials on Symbian application development, mainly OPL-focused.
- ❏ **Developer.com** (<http://www.developer.com/ws>). Articles and tutorials on mobile development including BREW, Java and browsing.
- ❏ **DevX** (<http://www.devx.com/wireless/Door/7049>). Articles, tutorials and forums on mobile development. Also features vendor-sponsored channels.
- ❏ **JavaWorld** ([http://www.javaworld.com/channel\\_content/jw-micro-index.shtml](http://www.javaworld.com/channel_content/jw-micro-index.shtml)). Articles, tutorial and forums on mobile Java development.
- ❏ **MicroDevNet** (<http://www.microjava.com/developer>). Articles and other resources for mobile Java development.
- ❏ **NewLC** (<http://www.newlc.com>). Articles, tutorials, reviews and forums on Symbian application development.
- ❏ **O'Reilly Wireless DevCenter** (<http://www.oreillynet.com/wireless>). Articles on mobile development.
- ❏ **W3 Schools** (<http://www.w3schools.com>). Tutorials on mobile development technologies including browsing, SVG and .NET for mobile.
- ❏ **XML.com** (<http://www.xml.com/mobile>). Articles and tutorials on using XML in mobile applications.

#### Network Operators

- ❏ **Orange** (<http://developers.orange.com>). Downloads, documentation and forums for Java, Symbian, Palm and Windows Mobile developers. API documentation and tech support available to premium members.
- ❏ **T-Mobile** (<http://developer.t-mobile.com>). Tools, documents and support for members concerning browsing, messaging, Java and PocketPC technologies.
- ❏ **Vodafone** (<http://via.vodafone.com>). Support and documentation, mostly limited to partners.

#### Standardization Groups

- ❏ **3rd Generation Partnership Project (3GPP)** (<http://www.3gpp.org>). Information on technologies including multimedia formats, MMS and radio networks.
- ❏ **Liberty Alliance Project** (<http://www.projectliberty.org>). Information on digital identity and related matters.
- ❏ **Open Mobile Alliance (OMA)** (<http://www.openmobilealliance.org>). Information on mobile standardization including protocol stacks, markup languages, SyncML, digital rights management, location and presence.
- ❏ **World Wide Web Consortium (W3C)** (<http://www.w3c.org>). Covers browsing, SVG, SMIL and other mobile-related technologies.

#### FOR MORE INFORMATION

For a comprehensive overview of Adobe GoLive CS2, please visit <http://adobe.com/products/golive>

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