A New World Needs a New Internet

DoDots™



This is a Dot™
Dots™ represent an entirely new way to brand, package, and distribute your Internet content and applications. A Dot is essentially a small package of Internet content that is delivered directly to your customers' desktops. Anything that can be delivered on a Web page can be delivered in a Dot, including applications and rich media, but unlike a traditional Web page, your customer no longer needs to "go out" to the Web to interact with your content or your company.



This is a DotPack™
The DoDots proprietary messaging architecture allows Dots to work together in DotPacks. Dots "talk" to each other, so they can be combined in custom, multi-window Internet applications that deliver information on demand, provide a service, even close a sale. Compact and simple to create, Dots are nonetheless a versatile, powerful new tool for interacting with your customers.



Dots Run On Personal Computers
Dots and DotPacks are actively displayed on your online customers' desktops and can be viewed while using any other application, eliminating the need for your customers to stop other work to access your Internet content. Any number of Dots or DotPacks can be open and running simultaneously, providing your customer with a rich Internet experience. Dots provide you with direct access to your customer and a persistent presence on their desktop.

It's A New World

Business as usual? Not anymore. The Internet has changed everything. It's made the world a smaller place and the market a bigger space. The opportunities are global.

But the Internet's original promise has hit the wall. Content flows freely—which is great, unless it's your content. Brands co-mingle on Web pages—which is fine, unless it's your brand getting lost in the shuffle. Access to information is limitless—which is wonderful, unless you want people to actually read and understand your message.

The Internet today doesn't work for your business or your customers. And if someone doesn't do something, it's going to get worse before it gets better.

Off the Desktop
The Internet is expanding beyond the desktop, fast. Soon more and more of your customers will expect to access your content—and do business with you—from anywhere, anytime, on a variety of devices. And they'll expect not just any content, but content that's specific to them. They won't sit still to page through your Web site. Much of the time, they won't even have a browser.

DoDots: A New Internet

DoDots is a digital infrastructure company. Our technology enables you to deliver your Internet content—your brand, products, applications, and services—directly to your customers, regardless of their physical location, platform, or device.

Dots focus content on the customer. They create more personal, private, and secure relationships online. It's not just a new and better way to deliver content: it's a new and better way to build brands, drive sales, and increase advertising revenues.

DoDots technology also allows you to understand what your content is doing: how it's being distributed, collected, used, and shared. For example, with DoDots, you know how many unique users are accessing your content, how often, and for how long.

As a simple, quick-to-deploy way of packaging and delivering your content, DoDots Technology is ready to help you revitalize and extend the realm of your Internet business now. And the scalable DoDots infrastructure will enable you to exploit new ways of using the new Internet of the future.



Dots Go Mobile
The DoDots digital infrastructure allows you to automatically extend Dot-based content and applications to your customers' mobile devices, letting you reach your customers with relevant, branded content or applications anytime and anywhere. Our solution allows you to optimize content delivery for each device, while providing a seamless customer experience, on and off the desktop.



Wherever the Internet Goes, Dots Go
The DoDots extensible architecture will allow you to deliver Dot-based solutions to virtually any Internet-enabled device and is designed to accommodate the future innovations of the industry, our partners, and our developers. As the Internet moves off the desktop and as customer behavior evolves, our technology assures long-term viability for your content, applications, and services. Wherever the Internet goes, Dots will go.

DoDots Today

New access devices and new user behaviors are rapidly changing the Internet and for savvy businesses expanding its potential by orders of magnitude.

DoDots solutions can change the way you do business online now—and make your Internet initiatives more effective, more successful, and more profitable.

DoDots today can multiply the uses and effectiveness of your Web site...create new opportunities for packaging and distributing content you already have...broaden your reach, and build your presence on the Internet.

Drive Sales
With DoDots technology, you can build product awareness, increase customer response and interaction, remove barriers to purchase, and shorten the sales cycle. Dot-based product offerings have distinct advantages over other Internet sales tactics.

Delivered directly to the viewer's desktop or other device and displayed persistently, they increase exposure of your message. Dots are inherently "permissioned," so people who receive them are effectively pre-screened as receptive prospects. Dots can be designed to take a viewer to other Dots or to specific Web pages for additional product and sales information. Because Dots can be configured to include any application, customers can even purchase products or services directly from them.

Increase Advertising Revenue
DoDots technology delivers advertising in context with your targeted content, creating demand and awareness directly from the Dot, increasing advertising efficiency and response rates.

As a Web publisher, Dots enable you to offer advertisers more effective, and more valuable ad services. And as an advertiser, you can count on increased sales and revenue from Dot-based advertising—as well as building better relationships with your customers online.

Distribute Content Faster and Farther
Content providers and publishers, from media and news organizations to entertainment companies, are adopting DoDots technology for the simple reason that it represents a better, more timely, more profitable way to brand, package, and distribute digital content and applications.

Dots can distribute news in real-time—essential because the value of news diminishes quickly. Because Dots are delivered directly to desktops, they're available and viable for longer periods throughout the day, extending the useful life of both content and advertising. Dots also extend the reach of your content and applications beyond traditional distribution vehicles, such as PCs, as the Internet extends to other devices.

Track More Page Views and Clickthroughs
Dots have been proven to increase viewers' use of online content and applications by as much as 3000%.

Because many Internet businesses today are built on advertising revenues, Dots are configured to provide comprehensive, auditable reports on number and frequency of page views, unique users, and clickthroughs. And Dots can track and report on the same metrics as the Internet leaves the desktop. The DoDots infrastructure is equipped to monitor Dot activity regardless of where it takes place, on or off the desktop.

Deliver Dots as Rich as Your Media
Anything that can be put on the Internet can be put into a Dot. So Dots can deliver your existing media content, from graphics and text to streaming stereo music, digital video, or virtually anything else. And with DoDots technology, various types of content can be grouped.

Delivered in packs, Dots can be configured to "talk" to each other and interact when opened. DotPacks provide users with a richer experience. They give you a way to distribute content that's both more engaging and more profitable—for example, an advertising message coupled with a sales application—in a single package.

Escort Customers Through the Sales Cycle
StartSampling uses Dots to distribute free product samples to interested consumers. By "ticking down" on remaining samples in real time, this Dot adds both urgency and interactivity to the product information at hand. Users can keep abreast of sample Web site offerings without opening their browser. Beyond acquiring prospects, Dots can also take customers through the entire sales cycle, from initial product awareness to purchase.



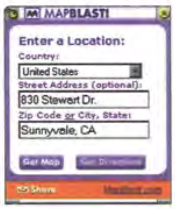
Deliver News and Data on Time in Real Time
CNET uses Dots to distribute timely industry news, product reviews, and shopping information. Like all Dots, CNET Dots can be configured to open upon startup to provide viewers with industry news when they turn on their PCs or other devices at the beginning of the day. Dots can be set either to sit on top of other applications or recede to the background—but still update in real time to meet users' information needs.





Reach Customers Ready to Buy
MapBlast uses Dots to deliver maps directly to customers on the go from where they are to their advertisers' nearest location. Over time, and especially as the Internet extends beyond the desktop, this type of immediate, "context-based advertising" will increase advertising efficiency by delivering information and offers just when customers are nearby or otherwise likely to buy.





Brand Your Content All Day, Every Day
Using Dots to distribute its Word of the Day feature and the Merriam–Webster Dictionary online, Merriam–Webster has dramatically increased the number and duration of user views of M–W content. The Dots reside on the user's desktop—fully functional, whether there's a browser open or not. Because Dots work alongside other applications, customers can use the dictionary and a word processor, or other application, simultaneously.





DoDots Tomorrow

DoDots technology today offers unique, powerful solutions for your existing Internet business. But what it will do for you tomorrow is even more important.

Become a DoDots Customer

If you would like to use DoDots to make your Internet business more successful, visit www.DoDots.com, or contact us directly at 408-331-7200.

Become a DoDots Partner

DoDots is actively teaming with technology partners to help spread the DoDots vision of a New Internet for a New World. Device manufacturers, service companies, and other technology integrators can all benefit from the DoDots infrastructure and business model.

If you'd like to learn more about integrating Dots into your product, solution, or service, please visit www.DoDots.com.

Become a DoDots Developer

The rapidly growing community of Dot developers is using Dot technology to solve problems and create profitable new opportunities for their customers. The unique characteristics of Dots, the ease with which they can be created, and the value they represent to customers make them an attractive service offering for developers. To learn about becoming a DoDots developer or to enroll in the DoDots Developer Program, please go to www.DoDots.com.

As the Internet extends beyond the desktop to other devices, businesses will need to adopt new technologies and behaviors in order to maintain contact with customers and partners. And it's going to happen faster than you think.

DoDots technology has been designed from the start to anticipate the future, which is now rushing at us all. Here's how the DoDots digital infrastructure will help you stay competitive, grow your business, and take full advantage of the New Internet.

New Distribution for New Devices
DoDots technology will allow you to distribute content and applications to a wide range of portable and other next-generation Internet access devices. With Dots, it's easy to scale and optimize your content and applications for delivery, display, and performance on any device.

Content Management, Tracking, and Reporting
Managing and tracking Internet content becomes far more complicated as the Internet leaves the desktop. But monitoring and measuring how your content is being used—while ensuring both your security and the privacy of your customers—will be essential to profitability. With Dots, you can manage, monitor, and analyze your customers' interactions, while maintaining their privacy and your security.

E-Commerce Opportunities
As the Internet leaves the desktop, new e-commerce opportunities will emerge that will dwarf today's Internet commerce models. Smart ordering, context-based advertising, and hybrid delivery schemes will evolve to meet customer expectations. The flexible, scalable DoDots digital infrastructure will provide an integrated e-commerce platform for new business models addressing new customer behaviors and demands.

Direct Customer Contact
Your customers will expect to be able to interact directly with your content and applications—wherever they are, using any device and any platform. The DoDots digital infrastructure will make that level of ubiquitous customer contact a reality.

Robust, Extensible Solutions
In the rapidly changing, wide-open environment of the New Internet, you do not want to invest in closed architecture or un-scalable solutions. The DoDots digital infrastructure is an open, standards-based, scalable architecture that will assure the long-term viability of your content, applications, products, and services.

How Dots Work

The DoDots digital infrastructure for Dot distribution and use involves interaction between DoDots application servers, DoDots client software, and Dot providers' Web servers.

One-time installation of DoDots client software is simple, fast, and virtually transparent to the user.

Dot development is just like Web page development, and Dot providers serve Dots the same way they serve content to their Web pages. No additional server software is required.

Dot Development: Easy and Inexpensive
The first step in Dot development is designing and generating content for the Dot. Any content that can be displayed in a Web page can be displayed in a Dot, including text and graphics, streaming media, Flash, HTML, JavaScript, and secure transactions. Dot developers can use their existing tools and methods to develop Dot content.

Once the content has been defined, developers use the DevDot™ to create a new Dot. This process is much like generating normal HTML content for a Web site. Starting with an empty Dot definition, the developer simply configures the input fields provided by the DevDot.

How Dots Are Served
When a Dot developer creates and publishes a Dot, a new Dot description is saved to the DoDots application server. The Dot description defines the Dot package and behavior. URLs in the Dot description point to the Dot content, which is hosted on the Dot provider's Web server.

When installed, the DoDots client software sets up and maintains a HomeDot™ on the user's computer or other access device. The HomeDot acts as a manager of all Dots the user might collect. The client software also creates a user account on the DoDots application server the first time it connects with the server.

Anytime a user starts the DoDots client software and logs in, the HomeDot requests the user's account from the DoDots application server. The server returns the profile, which contains descriptions of all the Dots the user has collected and a snapshot of the state they were saved in when the user last logged off. The user's DoDots client software restores all Dots in that state.

DoDots Customer Reporting
DoDots provides content providers with a full suite of audience and use measurement reports—on a secure server, of course. Optimized to help you make informed strategic business decisions, these comprehensive, auditable reports cover:

- Dot page views
- Unique users
- Clickthroughs
- Dot usage by time intervals
- Dot sharing patterns and trends
- Demographic profiling
- User retention

In addition, DoDots offers custom data mining and analyses based on your specifications.

Deliver and Sell Media in a DotPack
Dot technology will enable music studios to promote and distribute samples of a new recording—even sell music directly to consumers. An "album" Dot can be bundled with other Dots containing a picture of the artist and traditional album cover. Another Dot can list the songs, where clicking on a title would start a sample playing, while a third Dot could allow the user to purchase the CD.



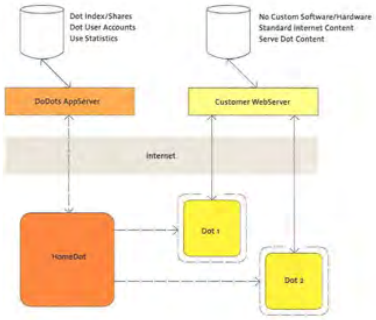


Provide and Gather Information
Some companies already use Dots to package and distribute financial information specific to each customer's requests. DoDots technology allows you to "cluster" information such as charts, customized portfolios, industry research, and—eventually—advertising and transaction capabilities in a single DotPack. While the customer gets information that encourages more transactions, you gain a better understanding of how your content is being accessed and used.





Technically Speaking
DoDots application servers deliver millions of Dot descriptions and user accounts. Your content is still delivered direct from your servers to support the scalability needs of your company.



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    - Patent Status Report
    - Select Abstracts
    - Common Background and Summary
    - Sample Figure
- DevZone Materials / SDK ..... *separate*

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Goals

Leave feeling confident we can make this work

- Outline H3G reasons to purchase DoDots technology and retain team
- Address technical questions and establish technology fit
- Understand the needs and wishes of the key team members
- Identify best way to manage remotely

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Agenda – Monday

9:00a Introductions and Overview

- Situation
- Technology Review

1:00p Lunch

1:30p Team meetings

- Team Discussion
- H3G presentation to team
- Individual meeting with team

5:00p Social

- Drinks with team
- Dinner in Palo Alto

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Agenda - Tuesday

9:00a Working Together

- Integrating Team & Roles
- Remote Management & Communication

10:30a Financial & Legal Situation

- Assets & Liabilities
- Purchase Process
- Operating Costs

12:00p Moving Forward

- Timeline
- Program for due diligence


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Hutchison3G
shared Vision

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What's the situation?

- H3G needs to deploy a 3G Network (on time) in 2001 with a CMS that will help drive customer adoption and revenue

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What's the situation?

- DoDots has built and deployed a complete Content Management System strategically aligned with H3G needs

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Best fit for H3G's core CMS

- **Key attributes of a complete Content Management System:**
  - A scalable architecture supporting millions of users
  - Client technology deployed across multiple devices
  - Back end integration with billing and CRM systems
  - SDK for providers to publish, track, and monetize content

- **DoDots is the only company that has built, deployed, and battle tested that complete system.**

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DoDots best fit for H3G's core CMS

- DoDots existing infrastructure and team makes it possible for H3G to deliver the complete solution on time with lowest risk and highest reliability of final deployment

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What's the decision?

- **DoDots as a part of H3G is essential to H3G success**
  - Purchasing DoDots and hiring core team is best alternative

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DoDots Technology Overview

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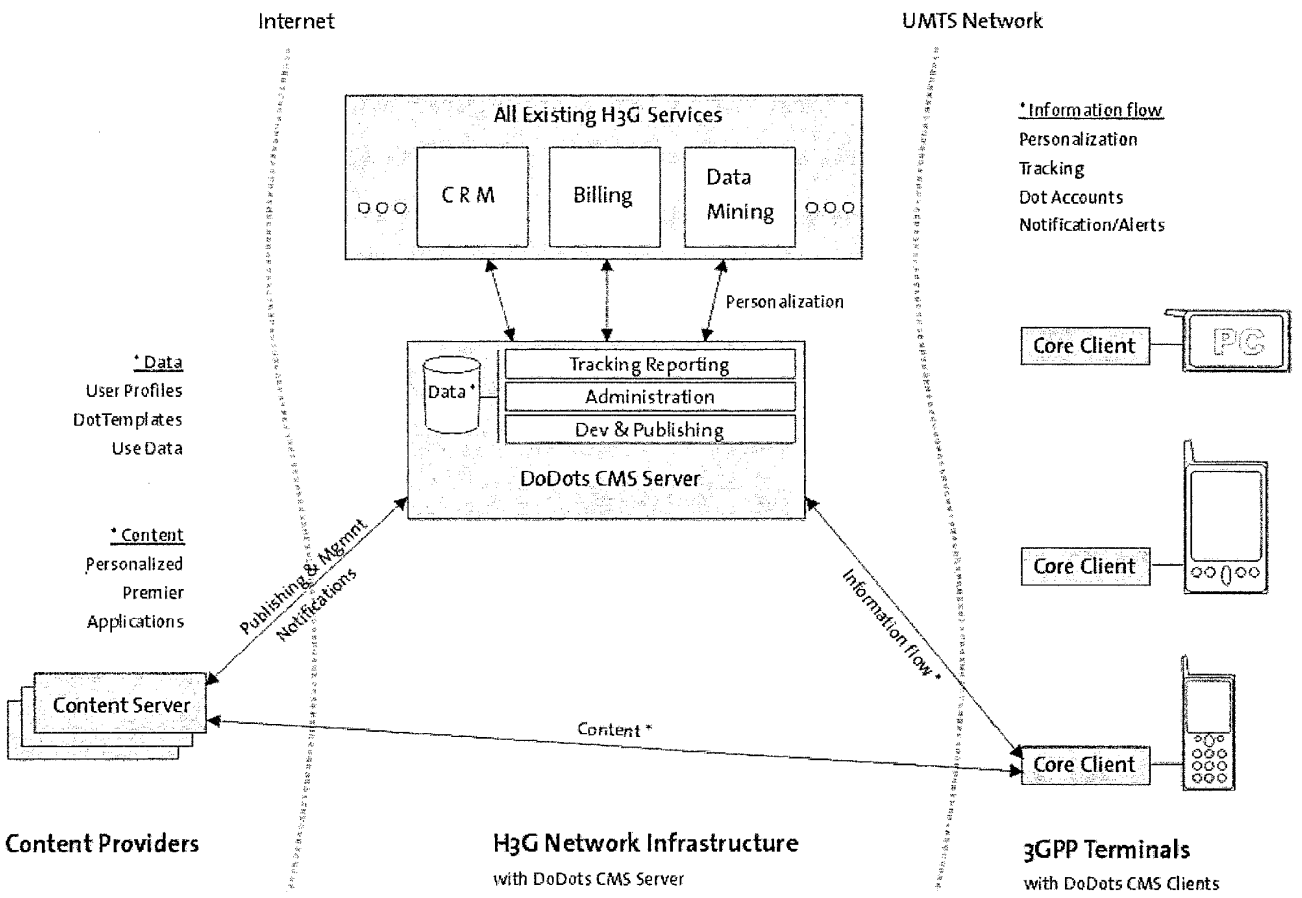
Technology Review

- **Goal : Review of DoDots technology components and their fit with H3G CMS goals**
  - Architecture
  - Server
  - Client
  - Reporting
  - SDK
  - Environment Management

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DoDots Architecture



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Architectural Benefits

- Fundamentally scalable
- Multiple device support
- Activity tracking
- Application management & deployment
- Advanced development and publishing

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Server - Function

- **The DoDots Java servers do the "heavy lifting"**
  - Run content publishing and delivery services
  - Centralize Users' Personalization
    - Accounts and Sessions, content collection, permissions and personalization, Personal Dot collections
  - Implement "live packaging"
    - Notification, sharing, Dot definitions
  - Accumulate statistics

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Server – Battle Tested

- **Scalability**
  - Neither proxy nor serve content
  - Dynamically adjust for traffic bandwidth
  - System modeled & simulated for 2M users
- **Reliability proven**
  - Over a year of releases with four revisions, QA testing, and end user load scaling
  - Server is now scaled to 40 Sun CPUs with over 250k users
- **Portability confirmed**
  - Several single server configurations have been deployed on Solaris, Linux and NT

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Server – H3G Integration

- **How to integrate into the H3G environment?**
  - Configure and install database and app server(s) at H3G
  - Integrate our data collection with H3G billing and CRM systems
  - Integrate account authentication with H3G user database
  - Enhance administrative functionality
    - Initial provisioning of user content accounts
    - Ability for administrators to add/remove/reset accounts

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Client - Function

- **The client is the content delivery vehicle:**
  - Core Dot Client Services
    - Login, User Preferences, Dot Object Model, Dot Messaging
  - OS Integration
  - Device Specific User Experience
    - Windowing GUI, etc.

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Client – Thin Client Development

- **DoDots architecture facilitates rapid client development**
  - Much of the "work" is done by the server
  - Core services design is platform agnostic
- **The current thin client prototype includes:**
  - Account retrieval from production server
  - Layout of web content panes
  - Generation of basic activity events for billing and auditing

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Demo

Thin Client demo
Eric Bowman

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Client – H3G Integration

- **Map H3G desired system functionality to native terminal capabilities**
- **Collaborate with H3G on terminal user experience design**
  - Incorporate content partner feedback
  - Test usability of mockups and prototypes

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Reporting

- **Wide array of usage activity events captured for billing and auditing**
  - Click throughs, impressions, notification events
  - Sent to database by DoDots client
- **Aggregated activity information is exposed to content partners**

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Demo

Reporting
Jim Mackraz

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Reporting – H3G Integration

- Move usage activities profiling to thin client or server based scheme
- Add event tags to track provider specific multimedia, commerce, etc.
- Integrate with H3G billing & CRM systems

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Software Development Kit

- **SDK allows deployment of Dot content using a content provider's existing assets, tools, and practices**
  - Core Development Tool ("DevDot")
  - API documentation
  - Training materials
  - Course outlines
  - Examples
- **SDK ensures your content partners deliver on time**

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SDK – H3G Integration

- Modify content scripting model and tools as required
- Create Dot samples to canonize H3G's user experience guidelines
- Extend provider specific tags as needed

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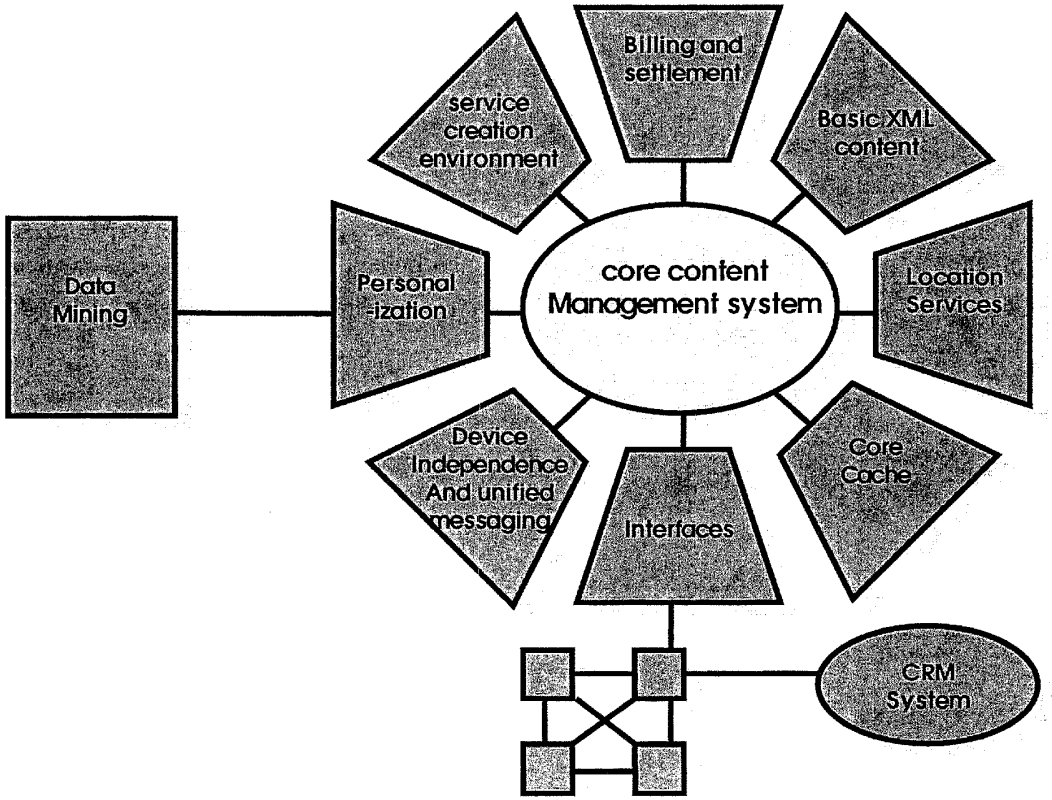
Environment Management

- **Administration Zone**
  - A browser based interface exists to administer our database tables
    - Allows system administrators to manage user account and Dot content registry
- **Production Support**
  - Production monitoring and alerting systems
    - Includes Oracle db monitor tools, server health polling, etc

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DoDots™ H3G Content Management System



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Integration
Imagineering

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DoDots & H3G Working Together Team

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Discussion

- **DoDots / H3G integration**
  - Roles
  - Establishing and measuring common vision and goals

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Roles

- **Engineering**
  - Continue on H3G specific development
  - Team managed by Engineering Director (Jim Mackraz)
  - John Kembel will manage the long range technology vision
  - Begin building small QA team in 6/2001

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Roles

- **Management**
  - George Kembel could act as General Manager
  - Eric Klein could act as Project Liaison, based in London?

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Challenges in this structure

- Bridging the time and distance gap
- Aligning management goals
- Ensuring robust communication

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Bridging geography

- **Previous experience managing geographically disperse offices**
  - Eric, Jim, Neil have such experience
- **Strategic location**
  - 15 minutes from major hardware, software, eCRM and wireless vendors
  - Quick trip to Asia (terminal manufacturers)

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Ensuring communication

- Provide reciprocal access to engineering servers
- Station a H3G SV liaison in London to facilitate common goal and information flow
- Frequent engineering team meetings here or in London
- Regularly scheduled tele/video conferences and milestone reviews

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Financial & Legal Situation Asset purchase

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ABC - overview

- **ABC = Assignment for the Benefit of Creditors**
- **Objectives of the ABC**
  - Proactively address creditors
    - Prevent a bankruptcy
  - Simplify process to sell intangible assets
    - Isolate assets from remainder of the business
- **Authorized by state statute**
  - Empowers assignee to act on behalf of creditors
  - Court supervision not required
  - Protects asset buyer from creditor retribution

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ABC process: assignment

- **Company assigns all assets to a 3rd party (Sherwood)**
  - Sherwood regularly used by leading Silicon Valley VC's
- **DoDots corporate shell remains**
  - No assets: all assigned to Sherwood
  - Liabilities remain with shell
    - Includes non-essential contractual obligations
  - No employees: now Sherwood contractors
  - No board members: officially resigned

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ABC process: liquidation

- **Assignee liquidates assets**
  - Sherwood sells tangible assets
  - Stratagem leads sale of intangible assets
    - Stratagem retained by Sherwood, not DoDots
  - Contracts assigned as needed
    - Equipment leases, software licenses, etc.
- **Asset buyers have no connection to DoDots**
  - Purchase agreements executed w/Sherwood
    - Protects buyer from creditors but not infringement claims

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ABC process: Wind Down

- **Sherwood manages all creditor interactions**
  - Will defend suits, if required
- **Cash from asset sale pays (in priority order)**
  - Employees (nothing owed)
  - Creditors ($6M+ owed)
  - Shareholders ($17M invested + common)
- **Wind down DoDots corporate shell**

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DoDots™

Tangible Assets

- Development, Test, Stage, and Production environments (all Sun Solaris ~30 boxes)
- QA test racks
- Internal communications infrastructure (Lucent for telephony, Dell NT servers for mail, etc)
- Call center equipment and environment
- Desktops, Laptops and Sun workstations (~100 desktops plus ~25 laptops and ~20 Sun stations)
- Furniture and miscellaneous equipment

(Over $3.3M invested in tangible assets to date)

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DoDots™ Technology & Development Assets

- $15 million invested in DoDots's technology & IP
- Development investment represents 60 man years over 2 years

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Notes

DoDots™

DoDots & H3G Working Together

Cost

DoDots™

Timeline - Operating

1/30	2/28		5/1	12/31
2-week	Transition	Integration	Drive to Beta	ongoing
•In process	•Retain core team •Secure equipment & space •Continue Development	•Begin operations as H3G subsidiary •Build out team •Drive to integration	•Add content and QA hires	•Drive to final
LOI . . . . . DA		Deal closed		2002

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DoDots™

Operating costs - summary

Operational Cost Projections

	Transition period	Integration period	Period to Beta launch	2002 and onwards
Direct salary costs				
Core Development	168,800	128,000	170,500	170,500
Management	22,400	29,500	29,500	29,500
Support	14,400	27,500	27,500	27,500
	205,600	185,000	227,500	227,500
G&A	80,000	138,125	143,438	143,438
Monthly costs	**$ 285,600**	**$ 323,125**	**$ 370,938**	**$ 370,938**
Duration of period	**One month**	**Two months**	**Eight months**	**Thereafter**
Costs to end of 2001			**$ 3,899,354**	
Annual costs 2002 onwards				**$ 4,451,256**

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DoDots™

Operating costs - detail

Operational Cost Projections

January-01

Legend:			
Payor:	H3G Expense	DoDots Assignee	Subject to H3G Intentions

Staff roles (heads)	Transition period (four weeks)	Close 2/28	Integration period (two months)	Period to Beta (eight months)	2002 onward
Core Development					
Server eng. (2)	39,200		22,500	22,500	22,500
Client Eng (2)	35,200		21,667	21,667	21,667
Database (1)	18,400		10,833	10,833	10,833
Content SDK (2)	36,000		20,000	20,000	20,000
Proj Mgmt/Specs (1)				10,833	10,833
ContentGraphics (2)				13,333	13,333
Sys./Software Arch. (1*)	40,000		20,000	20,000	20,000
QA (2)				18,333	18,333
Engineering Manager (1)			16,000	16,000	16,000
Technologist (1)			17,000	17,000	17,000
Management					
Project Liason (1)	22,400		12,500	12,500	12,500
General Manager (1)			17,000	17,000	17,000
Support					
Finance and Admin (1)			11,667	11,667	11,667
IT/Facility (1)	14,400		9,167	9,167	9,167
Office Manager (1)			6,667	6,667	6,667
G&A					
Rent	40,000		40,000	40,000	40,000
Utilities (incl. connect)	40,000		15,000	15,000	15,000
Other costs			83,125	88,438	88,438
Total costs	$ 285,600		$ 323,125	$ 370,938	$ 370,938
Period	four weeks		monthly	monthly	monthly

Analysis of other costs:

Administrative services	20,000	20,000	20,000
Travel	15,000	15,000	15,000
HR benefits and morale	15,000	15,000	15,000
Office expenses	10,000	10,000	10,000
Payroll taxes, etc	23,125	28,438	28,438
	83,125	88,438	88,438

nb - compensation estimates assume equity incentive packages are available

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Notes

DoDots™

Program Moving Forward Timeline

DoDots™

Timeline - Transition

1/30	2/28		5/1	12/31
2-week	Transition	Integration	Drive to Beta	ongoing
• In process	• Retain core team • Secure equipment & space • Continue Development	• Begin operations as H3G subsidiary • Build out team • Drive to integration	• Add content and QA hires	• Drive to final

LOI . . . . . DA Deal closed 2002

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Roadmap - transaction

Meet to discuss merits of transaction	22 January 2001
Purchase order raised to retain team	26 January 2001
Agree and sign LOI	31 January 2001
Complete due diligence	9 February 2001
Agree and sign legal documents	28 February 2001

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DoDots Team Roles



DoDots Team Roles

JDM, January 18, 2001

This note enumerates the individuals of the DoDots core development team, management, and support crew, with a brief synopsis of their skill set and experience, and some indication of the role or roles they may serve as contributors to the **Hutchison 3G** pilot and deployment efforts.

Bruce Boyd, Director of Information Technology

Bruce has been the manager of the in-house network at DoDots since its inception. He has demonstrated an important ability to balance the need for a stable business network with the cutting-edge configurations that the technology group needs for their development environment. He would be a welcome member of the management of our development office going forward.

Bruce received his BA from the University of California, Berkeley.

Eric Bowman, Lead Software Engineer

Eric ("Bobo") is our lead client systems programmer; he is also versed in all protocol between the DoDots client and server. He has deep understanding of all aspects Windows 32/CE programming and will be instrumental in working out the tradeoffs between terminal client capability and functionality.

Eric was recently the lead technical programmer on *The Sims*, the worldwide best-selling PC entertainment title, and prior to that he was a charter employee of the Maxis Core Technology Group. Eric has broad and deep expertise in several programming languages and technical domains.

Eric received his BA in Physics from Reed College, and his publications include *Direct3D: Professional Reference*. (New Riders, 1997)

Ashwin Dixit, Senior Software Engineer

Ashwin is a recent addition to the core technology team. His primary role here has been with the billing and auditing reporting system. Ashwin would be the lead person on extensions to the activity event collection system, and for the integration of our collection system with billing and CRM systems.

Ashwin has over eight years of software development experience, most of it in a leadership role or as a senior consultant. His recent experience includes server-side integration projects in the financial sector, including creation of data feeds and data analysis. He was also Managing Editor & Webmaster of *Engineering Information Village* a commercial web service for engineers, named the "Best Science and Technology site - 1996" by *Online Access* magazine.

Ashwin received his Bachelor of Science in computer science from Stevens Institute of Technology, NJ.

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Derek Fung, Lead Web and Dot Content Developer

Derek is a senior web developer, with deep expertise in all things HTML/JavaScript, in addition to scripted backend techniques and applications. He created our innovative "content snipping Dot" (the Dot-O-Matic) and has a unique understanding of DoDots content development from both the server and client perspectives.

Derek also has been working on Mobile Dots as long as anyone here, and was instrumental in the multi-device prototype demo that won *Demo God* awards at *DemoMobile 2000.*

Derek has five years of experience designing and building large scale web sites. He has proven expertise in front-end and backend systems for cross-browser, cross-platform, multi-lingual, interactive sites. He also has worked as a graphic artist and look-and-feel designer.

He graduated with Great Distinction from McGill University, Montreal, Canada, with a BS in Molecular Biology.

Neil Katin, System and Software Architecture Consultant

Neil has made profound contributions to our software and systems architecture as a full-time consultant, and also automated our development and deployment processes.

His recent background includes a founding role at E-Greetings (first technical hire, built team as VP of Engineering, designed and wrote server applications, transitioned to CTO). E-Greetings currently serves an average of 350,000 visitors per day.

Prior to E-Greetings, Neil has provided technology leadership for several high-profile operating systems and network technology companies, in the capacity of director, architect, and principal engineer. These companies include Sun Microsystems, Amiga Computer, and Parallel Computer.

Neil received a dual degree from Johns Hopkins University: Bachelors in Electrical Engineering, and a Masters in Environmental Engineering.

George Kembel, Chief Executive Officer and Founder

George is our CEO, and responsible for strategic direction and relationships, and executive management of the organization.

As a DoDots™ cofounder, George has experience starting and managing successful companies, most recently as founder and president of ENGAJE Corporation. The firm attracted numerous Fortune 500 and prestigious clients; including GVO, LeapFrog, and Interval Research. Previously, as a marketing engineer at the Intel Architecture Lab, George worked on new software technology and conducted frequent press, customer and conference briefings.

He has received two national awards for excellence in engineering design.

George holds a BS degree in Mechanical Engineering from Stanford and a MSE degree in Product Design with focus on high-technology marketing and corporate strategy, also from Stanford.

John Kembel, Chief Technology Officer and Founder

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John is the CTO, the principal inventor of the DoDots system, and develops the broad technical roadmap and architecture of the DoDots technology.

John, a DoDots cofounder, was also a founder of ENGAJE Corporation where he served as chief technology officer focused on new technology architecture and development. The company attracted numerous Fortune 500 and prestigious clients, including GVO, Leapfrog, and Interval Research. Previously, John worked as a software engineer at Intel and holds multiple patents assigned to Intel Corporation for software development. He has also served as a Design Engineer at IDEO, where he worked on consumer and technology product development, and as the lead software and database engineer for a Stanford University archaeological 3D-mapping expedition in the Peruvian Andes.

He has received two national awards for excellence in engineering design. John holds a BS degree in Mechanical Engineering from Stanford and a MSE degree in Product Design, with focus on embedded software, architecture and protocols, also from Stanford.

Eric Klein, Senior Director of Strategic Development

Eric has guided DoDots' expansion into the mobile market through key technology and customer partnerships. Most significantly, he has developed the relationship with Hutchison 3G from the outset.

Eric has served for over five years as senior management in business development and technical roles in the computer entertainment industry, and he worked at Apple Computer and Microsoft Corporation. His publications include *Inside Macintosh Games* (Hayden Books, 1995).

Eric received a BBA in Management Information Systems from The University of Texas at Austin.

Les Kopari, Lead Oracle DBA and Developer

Les is our Oracle production database administrator and lead developer. He develops and maintains the data model, provides leadership to the server application developers, and addresses all maintenance and troubleshooting chores for the development and production databases. In addition to continuing in his key development role, Les will be a central figure in all data warehouse and system integration projects that involve the DoDots production database.

Les has over eight years direct experience with Oracle, and almost 20 years of software development and DBA experience overall.

Les received his BSBA, Management Information Information Systems from Old Dominion University in Virginia.

Jim Mackraz, Vice President, Engineering and Support Operations

Jim is the VP of Engineering at DoDots. He built the engineering team and plays a technical design and architecture role, in addition to team and executive management. He also has played a key part in product definition.

Jim has a record of building and motivating hot teams, and for converting promising technology to high-value shipping software products in a wide variety of computing areas, including *The Sims* for Maxis/Electronic Arts, the Amiga ROM Kernel for Commodore-Amiga Computer, and the Oceania *Wave* electronic medical record system.

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Jim received a BA from the Univ. of Michigan, and a MS from Stanford, both in Mathematics, and completed coursework requirements as a Ph.D. candidate in Mathematics at Princeton University.

Jaijiv Prabhakaran, Lead Software Engineer

Jaijiv is our lead Java programmer and designer, and is responsible for architecture, design, and implementation of the DoDots server. He recently developed the DoDots notification system, and the notification server gateway for content partners.

Jaijiv has ten years experience in software design and development on a variety of hardware and software platforms. Prior to joining DoDots, Jaijiv designed and lead development for the Etrade *OptionsLink* trading software and *Generation E* business trading services. He was a Member of the Technical Staff at Sun Microsystems, working on imaging systems in Java.

Jaijiv received his Master of Computer Science from Louisiana State University, and Bachelor of Electrical Engineering from Sardar Patel College of Engineering, University of Bombay, India.

John Russell, Director of Dot Development

John ("JR") is an early DoDots hire, as Director of Content Services and Development. He managed an extraordinary team of twelve designers and content developers, owned and developed outside relationships with key content partners, and developed the DoDots content interface design guidelines and developer training program. JR is the master of the DoDots SDK and, depending on H3G needs, would be especially valuable in developing and managing relationships with H3G content partners, as well as helping scale up the content partner program and developer support programs.

JR has been in the software industry since 1994, in a lead or director capacity since 1995. His experience has consistent themes of visual design, software product usability, and management of people and processes and customer/partner relationships.

JR received his BS in Studio Art from New York University, and his Masters from Stanford, in the Product Design Program.

Bryan Wang, Director of Finance

Bryan is currently in charge of the finance and administrative functions at DoDots. He brings a wealth of experience and skills to the management team.

Previously, Bryan worked for GetThere, Inc. as Corporate Controller where he led the finance and operations teams through the company's flotation on the NASDAQ market and was responsible for the company's registration documents and filings. Prior to joining GetThere, Bryan worked for nine years at the United Kingdom offices of Price Waterhouse where the final position held was that of Senior Manager. Bryan also held engineering positions with Westinghouse Electric Corporation and LCI Telecommunications prior to joining Price Waterhouse.

Bryan is a Chartered Accountant (member of the Institute of Chartered Accountants in England and Wales) and holds an MBA with distinction from INSEAD, The European Institute of Business Administration.

Jake Wobbrock, Senior User-Interaction Engineer

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Jake is a senior human-interaction engineer and client programmer. Jake's responsibilities include user-interface conceptual designs, prototypes, formal usability testing, and implementation.

Jake worked on "smart toy" and home automation products for Intel-Mattel, and contributed to the *Global System for Sustainable Development* at the Massachusetts Institute of Technology.

Jake has a MS in Computer Science and BS with Honors in Symbolic Systems, both from Stanford University. His graduate specialization was in Human-Computer Interaction. His publications include journal articles and proceedings on autonomous agent design, and he received the *Robert M. Golden Medal for Excellence in Research* while at Stanford.

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Notes

DoDots™

Technology Details Tech Summary



DoDots Technology Summary

JDM, January 2001

Introduction

This goals of this document are:

1. Explain the scope and structure of the DoDots solution
2. Provide some detail about the implementation and production platform
3. Indicate areas of work that may need to be done for an H3G deployment, and separately, the pilot project

Scope of the DoDots Solution

The DoDots solution has the following major subareas. More details and the benefits of each can be found in a later section.

CONTENT PUBLISHING

The DoDots management system supports creation, management, and defined attributes of packaged content ("Dots"), and associates content documents, applications, or streams with device-specific "players" ("Controls"). There are development tools, a developer's website, an SDK, and training materials.

USERS AND PERSONALIZATION

This area includes accounts and sessions, content collection and activation, account provisioning and personalization (presentation and application state), peer-sharing of Dots between accounts, permissions and authentication. We also support simultaneous logins on multiple devices.

USER CONCEPTUAL MODEL

Abstract (device independent) user-interaction constructs, including personal Dot collection, user reminders, transient Dots and hub Dots, Dot Packs (bundles of Dots published, installed, and selected as a group), and in-application notification.

DOT MESSAGING AND DOT OBJECT MODEL

Dot "instances" take on independent persistent state as they are used. An API provides portable ways for content to interact with Dot state.

NOTIFICATION

Events can be broadcast or directed from content providers to users, and received *in an application context:* they bring up an application directly (not just a text message). This technology complements text messaging standards, with profound benefits for end-users and content providers. There is both a manual web-page interface and server gateway interface for posting content/application events.

LOGGING AND REPORTING

Our system tracks events that are essential to fine-grained billing and customer profiling. Content-specific extensions to the tracking system provide even finer control.

CLIENT SOFTWARE AND TERMINAL DEVICES

The core terminal capabilities, such as login, account cache, and activity logging are implemented along with OS/device-specific extensions to the content presentation API, and integration with the terminal OS components, including installation and configuration.

MANAGEMENT UTILITIES

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Includes administration of content publishers and developers, user account administration.

SERVER-SIDE API FOR CONTENT PROVIDERS

Supplements the client-side API for thin (or zero) client configurations. This is in the design and experiment stage, in preparation for having requirements and capabilities of the targeted terminal devices (for H3G, and previously, for US corporate market and much lower-capacity wireless devices).

Implementation Status

The implementation of the following areas is discussed in more detail later in this document. As background, bear in mind that the server and Windows desktop client have been running in a full production deployment for almost a year.

We'll try to indicate where we foresee work to do for the H3G pilot milestone and full deployment, and also try to provide concrete information about the current status of production releases as well as prototypes in the lab.

- Dot Publishing
- Server Application
- Client-Server Protocol
- Windows Desktop Client
- Thin Clients
- Server-Side API
- Account Caching and Synchronization
- Notification
- Logging and Reporting
- Production System Deployment

DoDots Solution

DoDots are *live packages for live content.* The "packaging" construct is essential to the architecture and benefits of the system. Simply put, a Dot is a small XML document specifying presentation and application state of a network application, document, or media stream. Most importantly, it pairs a content URL with a "control type" suitable for displaying/running the content on a particular device.

Because multiple such pairings can be stored in a single Dot, a single semantic application (in the eyes of the user) can be accessed on various devices. This is without assuming a "holy grail" content transcoding system where all network manifestations of a website must share the exact same URLs, and a new and proprietary content delivery scheme is required of all the content provider partners.

Content Publishing

DoDots live packages are called ***Dots***. ***Dot Templates*** are content package definitions from which ***Dot Instances*** (or just ***Dots***) are created. Dot Templates and Dots are defined and managed as small XML records.

A scheme of publishers (***Providers***) and authors (***Creators***) is defined and administered in the DoDots database, which establishes permissions for creating and managing Dot Templates. A variety of descriptive attributes are also associated with Dot Templates for user access via category listings, search results, etc. The creation of Dot Templates is easily done using a privileged user-accessible Dot, the ***DevDot,*** which avails itself of special methods of the DoDots server.

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Through this tool, authors can assign attributes and behaviors of their Dots, and specify content URLs and the proper associated presentation controls. This provides H3G the benefit that content providers can self-administer their published content.

The operation of this tool, as well as basic concepts, samples, and JavaScript client-side API bindings, are part of the DoDots content SDK and training materials.

Dot creators can "stage" their Dot Template definitions during testing, when they are only available to a restricted audience, and fully "publish" them when they are ready for the broad audience.

We also have a dynamic website for management of a Content Partner Program that may be useful to H3G content partnerships.

Users and Personalization

User accounts can be *anonymous* (and tied to a single computer or mobile device) or *named*, in which case they may be accessed from more than one device. An account contains authentication information (e.g., password), user preferences, and a collection of Dots.

The original content choices in a new user's account can be provisioned flexibly; we map each different source of a new user (e.g., our distribution partners) to a "prototype account" that is easy to set up, and this account is cloned as part of setting up a new user. This enables flexible offerings of pre-loaded content, either in the sense of premium service plans, or for end-user affinity promotions (e.g., football fans).

A user can collect additional Dots in a variety of ways; in particular, one Dot can be used to "install" further Dots; we provide a standard system Dot that lends quick access to featured content. A standard website also provides one implementation of a searchable or categorized listing of available Dots.

It's important to note that Dots are personalized through use. *Presentation state* is established as the user opens, close, positions and sizes the Dot (on a device where that makes sense). *Application state* is a persistent store **on a Dot-instance-by-instance basis** which in some sense generalizes the browser cookie, and works across devices, and even across classes of devices.

Additionally, there is a "peer-sharing" scheme to transfer a selection of Dots from one user's account, preserving state, to another user's account. The core scheme for this is independent of the specific user "delivery" interface (our desktop client uses email with a link in it) and is in fact accessible via the Dot object model API.

Finally, a key capability of the DoDots system is support for multiple simultaneous logins of a single (named) user account. The user experience of this is designed appropriately around the usage scenario, be it a desktop/notebook user, or a mobile user with more than one mobile device or PC.

User Conceptual Model

Each client device calls for an appropriate user interaction design. But underlying the differences between client windowing systems, we provide some core user constructs that cross all devices:

PERSONAL DOT COLLECTION

The user's content-organization scheme is described a bit above. Content appropriate for each class of device is available to the user whenever meaningful. Completely different formats and

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interaction styles can be served to devices of differing capabilities.

USER REMINDERS

Users can set repeating alarms on individual Dots, providing a way to be reminded **directly** of content or scheduled events of interest. This can drive usage for the provider, and also provides a differentiating user benefit across all content and all devices. These reminders are not out-of-band text messages; they bring up a Dot and fire an event in the content application context; the user can directly view and interact with the Dot when the alarm event occurs.

TRANSIENT DOTS AND HUB DOTS

Dots can open other Dots (subject to provider domain restrictions). This can take the form of temporary (*transient*) presentations (detail viewer, live "dialog boxes," etc.) or permanently install a Dot in the users collection. We have used the latter to build "hub dots," our term for central control over a suite of Dot applications (see for example the ABC.com Dots). Again, these paradigms are not device specific, and provide unity of operation across devices of different classes.

DOT PACKS

We have a fundamental mechanism of grouping Dots into "Dot Packs," both for user facility (they can be opened or shared all at once) and for publishing, whereby a suite of cooperative or related Dots can be published as a bundle and collected by the user in one swoop.

NOTIFICATION EVENTS

We'll elaborate on this facility below, but it's important to remember that this unique form of in-context, actionable messaging is unified across all classes of devices.

Dot Messaging and Dot Object Model

We provide API extensions to content scripts (using JavaScript extensions on the desktop client, and with various alternatives in design for other settings). These expose a lot of the capabilities of the client's windowing management system, which are specific to the class of device. But a core set of these messages are independent of the presentation specifics.

We can provide an exhaustive list of the current Dot Messaging API, including the core set and exposure of rich control over the desktop presentation.

Notification System

Our system is rather unique, in that messages are addressed to the Dot instance, not just to the user or device. Content providers can post events through our server via a gateway API or an authenticated web page. Messages can be broadcast to a set of Dots, or directed to an individual Dot. This provides an enhanced facility to complement SMS text messages directed to users.

It's important to realize that when a notification event reaches the user's terminal, it is handled by a specific Dot, which opens up and "activates" in response to the event. This is a major benefit over text messaging, in terms of a "call to action.". It also provides the user ultimate control over accepting, muting, and opting-out of communication from a provider in a sure and anonymous fashion; a major spam-free advantage over more vulnerable email and SMS approaches.

When a Dot opens in response to a notification event, the user can take action immediately in the Dot which calls for attention; this removes barriers to many revenue opportunities: the user can be invited to engage quickly and directly in a purchase, participate in a service, or view time-sensitive premium content.

We also log the outcomes of posted notification events. The content provider can learn the "reach" of a notification broadcast, and even what "take rate" they got out of the call to action. This is a differentiating value from the point of view of the content partners.

We have found that consumers (at least in the US) express great sensitivity to intrusion on their privacy, and our approach provides considerable benefits from the end-user point of view, compared to providing one's email address or phone number to a commerce provider. These benefits are complemented by the *closed-loop reporting* benefits to content and system providers.

And again, this service is uniform across all device classes, even those without SMS or other text messaging support. As discussed in the implementation section, the transport mechanism used on a 3G mobile system can be significantly different from the desktop-and-firewall implementation.

Logging and Reporting

We collect a substantial set of information in the form of "usage-activity events" and ship them up to our servers in the background and move them to a data warehouse of sorts. Today, these provide coverage for our consumer-service revenue model (click-throughs, impressions, new user acquisition, etc.) and for online reporting of interest to our content partners' customer relations efforts.

As mentioned above, events also are reported in the course of handling notification events, to provide a key "closed loop" value of the notification communication channel.

Content API extensions allow providers to mark their Dots with "tracking tags" that make their way into the activity reports, to provide an even finer resolution and benefit to the reports. Coupled with Dot application state, the provider can learn much about how their content is being used, beyond the generic tracking of events and URL hits otherwise available.

The server architecture of this system is quite simple; it's ready-made for integrating with CRM and billing systems, and can be extended to define content-specific activity events and attributes for an even more refined view of what users are doing with the system and the content applications.

Client Software and Terminal Devices

It's important to understand that the functionality of our client software (namely the released Windows desktop client) breaks down into two buckets: 1) the core capabilities we must have in the abstract to support the various capabilities above, and 2) the very rich set of user-interface capabilities and operating system integration appropriate for a given class of device.

To provide some examples; these are core capabilities:

- Login
- Account cache and differential synchronization
- Activity logging
- Notification management
- User preferences
- Installation of Dots and Dot collection management
- Core Dot Object Model API extensions

Examples from the Windows client of device-specific capabilities:

- Rich window management, including individual layers managed by a single application program
- Window management control by content applications
- Presentation preferences
- Desktop icons, task bars, system tray

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- Bi-directional integration with native browsers (Netscape and Internet Explorer)
- Installation, uninstallation, registration, system configuration

The main thing to appreciate is that while the capabilities of the device dictate the implementation of the core feature set and also dictate the appropriate user experience, the rich (and arcane) Windows environment accounts for the large part of our application footprint on the Windows platform.

Management Utilities

We have a protected "Administration Zone" website that allows highly-privileged users to access and manage user accounts, the Dot publishing registry, and other Dot system internal database. We anticipate this system will someday include some more powerful tools to perform large-scale maintenance on user accounts.

Server-Side API for Content Providers

As described above, the Dot API for content creators is provided by the client, in the form of extensions to content JavaScript. Terminal devices with rich Java programming may call for new API bindings, but in anticipation of requirements (in the US) to support minimally-capable devices, we have design alternatives in place to migrate some of the core Dot Object Model to a server module, available to content providers as a Java server library, a SOAP-style HTTP gateway, or even as a content proxy server, to pass information in the request and response streams.

If there is the need for this, the best approach will depends strongly on the terminal's capabilities and the wherewithal and trust relationships of the content partners.

Implementation Status

This section provides a survey of the implementation status of many aspects of the DoDots system at the time of this writing, in an attempt to make clear what's real, and to indicate where we anticipate work in support of the H3G pilot project and full deployment.

We're happy to engage in further discussion and provide direct evidence as we can to validate any claims made. And we fully anticipate that our mutual understanding will grow as to what work is required in support of desired capabilities, and as required for the H3G terminal devices and backend integration partners.

As a brief background, the first broad public deployment of the DoDots consumer system (server and Windows client) was in early March 2000. The "Jacob" release (V2.0) saw a server release around December 1, 2000, and the Jacob Windows client is on release-hold having passed QA but pending premier customers and preparations for a marketing launch promotion. Business circumstances have put the consumer service release on hold indefinitely.

The DoDots consumer system has registered 250,000 users in that time, and supported many simultaneous sessions and given rise to a very low rate of support contacts.

Dot Publishing

The Dot (Template) definition XML has been in place since launch, including the multiple-control and multiple-control-type architecture, although most Dots in broad deployment contain a single "Browser" Web Control and embed multi-media player controls, if any, as objects in a web page.

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DoDots Exhibit 2027
Samsung v. DoDots - IPR2023-00621

The DevDot has been in use by the open developer community for many months, and there have been several releases of documentation and examples, as well as training events, in 2000. The Provider/Creator model and corresponding user privileges have been in place since launch.

Dot Template attributes in support of the Dot Index website (search, category listings) have been available since launch.

We have not yet applied user permissions to limit access to certain classes of Dots (e.g., "premium content" Dots). Published Dots are accessible to all.

For H3G deployment, we anticipate revisions to the content API bindings and corresponding documents and example "templates." We also will need to extend the DevDot and other tools to better manage creation of non-Windows Dot definitions, as well as provide a quick turnaround edit/preview/test cycle for Dot authors preparing content for multiple devices.

Server Application

The server application is Java code, in servlets (approximately 50,000 lines of text, 19,000 semi-colons). It has been deployed on the WebLogic application platform, and is now running fine on a much-more economical (and stable) solution based on Apache/JServe. The backend database is built on Oracle 8.

We are currently running 40 application server CPU's in production (Sun/Solaris) and have a couple of in-house development and stage configurations of the same technology. To validate the portability of the infrastructure, and to serve as a road-demo platform, we have recently ported (in about one day) the entire system (database, server application, runtime platform, with a local client) to a Dell laptop running Windows NT. The benefits of portable standard (Java, Oracle, Apache) run-time platforms have been proven.

This application has been through numerous iterations of tuning and troubleshooting, and has evolved to be stable and quick, and is well instrumented using the Log4J logging system.

For the H3G pilot, we don't anticipate much work if any on the core server application. For the production deployment, we anticipate backend integration projects as discussed below under logging and billing. We also anticipate bridging our notion of "user account" with the master user accounts (LDAP?) used by H3G. We also anticipate that the scheme for provisioning new accounts may be modified to reflect various product offerings and promotions and revenue models that H3G deploys.

Client-Server Protocol

Our desktop client currently talks HTTPS to the server. HTTPS was chosen in part to secure login transactions, and in part to provide some protection to our internal XML data formats in an effort to discourage "adventurism." It is in no way essential to our system, and is certainly the carrier's option.

We now (Jacob) use a differential synchronization protocol for maintaining the client's local account cache. At one time, we ran a zip-style compression over the payloads of certain transactions without problem. Standard wireless compressed protocol, such as tokenized XML, can be adapted without difficulty for the H3G full deployment.

The cache update, logging activity posting, and notification event polling are all robust in the face of intermittent (modem) connections, although the client needs to make a solid connection for initialization and login authentication and initial account cache validation.

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DoDots Exhibit 2027
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Because of firewall considerations, the protocol is always HTTP(S) to standard ports, with request always initiated by the client. Notification is thus done by polling, for the same reason. Some of these constraints may relax in a wireless carrier deployment, and provide alternative protocols for some purposes.

Windows Desktop Client

Again, this is a very intricate Windows application, with all the trimmings and a slick user experience, above and beyond the core capabilities needed by all Dot clients. We hope that over the long term, H3G will find benefit in support of Windows 32 computers (notebooks and desktops) and enjoy the value manifest in this particularly rich piece of software.

Thin Clients

We designed several alternatives for thin client (and zero client) implementations, and ported some low-level libraries (HTTP, XML) to some mobile devices we had around the shop, including off-the-shelf Windows CE devices (HP Jornadas).

As a validating prototype, and as an implementation "bread board," we recently brought up a thin client on Windows CE, featuring account retrieval, Dot display (with device-specific content formats selected appropriately), and rudimentary activity logging. Benefiting from the structure and open standards behind the server APIs and content publishing tools, this took less than a week and is now available for demo.

In pursuit of the H3G pilot project, we anticipate building out more core features and a better user experience, and especially working with H3G and Microsoft to get our hands on their latest OEM configuration options to try to be able to demonstrate streaming video across an H3G network cell.

Client development for any new computers or mobile devices in the H3G deployment requires conceptual UI design, validation, and implementation; implementation of core client services; OS integration; presentation extensions, and activity tracking to the extent supportable on the particular device.

Server-Side API

If the client terminal device lacks support for specific required features, we have several design alternatives to migrate functionality and some caching from it's position now on the Windows client, to the servers.

Account Caching and Synchronization

This scheme got a major upgrade in the Jacob release, including persistent (encrypted) caching of the Dot user account on the client, a differential cache synchronization protocol, and more robust behavior in the face of intermittent and slow modem connections.

H3G's decision and roadmap for support of multiple simultaneous logins by a single user (a 3G phone, a PDA, and/or a notebook computer) will drive requirements for work in this area. The Jacob solution is designed for multiple logins, which are intended to be exclusive work sessions. Control is generally seized by the device with the most recent user activity. We anticipate that it will be more difficult to provide a coherent user experience while a phone and PDA, for example, are being used with the same Dot account virtually simultaneously.

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Notification

The notification system as described is complete and deployed. Also, as mentioned earlier, the current transport protocol relies on polling by the client device; the polling latency interval can be controlled dynamically by the server, to balance notification response time versus server resources. On a closed network, where firewall barriers are not an issue, a more responsive and bandwidth-friendly scheme can be used for notification transport, where we rely on the client listening rather than polling, and let the server initiate the connection when needed.

Logging and Reporting

At present, the client captures many activity events and ships them to the server where they are collected without processing. Nightly, they are moved to our (rudimentary) reporting "warehouse" where we run queries for our billing department and for daily customer web-page reports.

Some activity events, including HTML navigation, are "trapped" using special component interfaces provided by the Internet Explorer (v4.0+) Web Control; it is not yet clear how well native component capabilities will support the full scope of this on other client platforms.

We anticipate building a gateway to transfer activity event logs to H3G billing and CRM partners in near-real time, as system resources and integration architecture allow.

Production System Deployment

We have a full, scaled, production footprint in our co-location site. The redundant architecture has held without significant downtime since launch, and we have developed tools for "jump-start" configuration of new servers, plus automated and reversible processes for building, staging, and promoting new server releases and database schema upgrades.

We run a combination of monitoring tools adapted from open-sources, Oracle-specific database monitoring utilities, and a proprietary set of tools provided by a managed care service.

The basic architecture of the DoDots package system requires only that we scale up the DoDots servers to support growth in the user population; we neither serve nor proxy content bandwidth, so we do not need to add site resources just to support new content providers or increased user activity.

For the pilot project, we anticipate configuration and installation of a small cluster in England. For the full deployment we anticipate configuration of a production environment in England.

DoDots™

Technology Details

Jacob – APIs / XML

Jacob Win32 Client 2.0.x
Dot Messaging Reference
1/8/01
EDB

Key:
RED -> System-only message
GREY -> Obsolete or duplicate message

System Commands

	Arguments	Return Value	System Only?	Notes
get-screen-width		#		pixel width of screen
get-screen-height		#		pixel height of screen
get-version		#.#.#		x.y.z style client version info
get-browser		[browser]		which browser is the default? (IEXPLORE, NETSCAPE, or Netscape6)
get-last-user		[username]	Yes	used by login dot
get-auto-launch		[true|false]	Yes	used by preferences
set-auto-launch	[true|false]	OK, ERR	Yes	used by preferences
get-network-standby		[true|false]	Yes	used by preferences
set-network-standby	[true|false]	OK, ERR	Yes	used by preferences
get-auto-login		[true|false]	Yes	used by preferences
set-auto-login	[password|]	OK, ERR	Yes	used by preferences
get-hide-taskbar		[true|false]	Yes	used by preferences
set-hide-taskbar	[true|false]	OK, ERR	Yes	used by preferences
get-skip-firewall		[true|false]		ABC-specific
set-skip-firewall		OK, ERR		ABC-specific
get-brand		[brand]		DoDots, ABC, CNET, Spinway. May be more in the future
refresh				force homedot to refresh
install-dot-with-callback				seems unnecessary
open-get-dot				any dot can now open the get dot
create-user			Yes	
do-login			Yes	
do-new-user			Yes	
open-transient-dot			Yes	
install-dot			Yes	
install-dot-and-open			Yes	seems unnecessary
test-login			Yes	
login			Yes	
login-remember			Yes	
logout			Yes	
quit			Yes	
end-login			Yes	
change-password			Yes	
is-user-registered			Yes	used by login dot
convert-machine-account			Yes	converts default acct to registered acct
destroy-machine-account			Yes	discards default acct
can-set-autologin			Yes	used by login dot
open-discard-acct-dot			Yes	part of reg process
open-convert-acct-dot			Yes	part of reg process
open-create-acct-dot			Yes	part of reg process
disable-hub			Yes	removes hub dot dtid, disabling hub dot
set-hub			Yes	changes hub dot dtid, to set new hub dot

Dot Commands

<DOT>	get-domain		[domain]		
	set-domain	[domain]		Yes	"system" or "0" domain
	get-kind		[kind]		
	get-dtid		[dtid]		
	get-address		[address]		very obscure dot messaging address
	get-notid		[notid]		
	set-notid	[notid]			
	get-trkid		[trkid]		
	set-trkid	[trkid]			
	get-dotify-links		true, false		should client modifies html to launch external browsers properly
	set-dotify-links	[true|false]			
	get-is-open		[true|false]		identical to get-opened
	set-is-open	[true|false]			identical to set-opened
	get-opened		[true|false]		identical to get-is-opened
	set-opened	[true|false]			identical to set-is-opened
<FRAME>	get-name		[name]		NAME attribute; appears in Homedot list
	set-name	[name]			
	get-pixel-width		#		width of dot, in pixels
	set-pixel-width	#			
	get-pixel-height		#		height of dot, in pixels
	set-pixel-height	#			
	get-width		# pixels		deprecated; use get-dot-width or get-pixel-width.
	set-width	# dot units			deprecated; use set-dot-width or set-pixel-width.
	get-height		# pixels		deprecated; use get-dot-height or get-pixel-height.
	set-height	# dot units			deprecated; use set-dot-height or set-pixel-height.
	get-size		[x pix] [y pix]		deprecated; use get-pixel-size or get-dot-size
	set-size	[x dot units] [y dot units]			deprecated; use set-pixel-size or set-dot-size
	get-pixel-size		[x pix] [y pix]		
	set-pixel-size	[x pixels] [y pixels]			
	get-dot-size		[x dots] [y dots]		
	set-dot-size	[x dot units] [y dot units]			
	get-dot-width		# dot units		
	set-dot-width	# dot units			
	get-dot-height		# dot units		
	set-dot-height	# dot units			
	get-collapsed		[true|false]		identical to get-is-collapsed; dot must be open (for no good reason)
	set-collapsed	[true|false]			identical to set-is-collapsed; dot must be open (for no good reason)
	get-is-collapsed		[true|false]		identical to get-collapsed; dot must be open (for no good reason)
	set-is-collapsed	[true|false]			identical to set-collapsed; dot must be open(for no good reason)
	collapse		[OK|Err]		dot must be open (for no particular reason...); same as set-collapsed true
	uncollapse				dot must be open (for no particular reason...); same as set-collapsed false
	get-position		[x pos] [y pos]		in pixels; identical to get-pos
	set-position	[x pos] [y pos]			in pixels; identical to set-pos
	get-pos		[x pos] [y pos]		in pixels; identical to get-position
	set-pos	[x pos] [y pos]			in pixels; identical to set-position
	get-position-x		[x pos]		in pixels
	set-position-x	[x pos]			in pixels
	get-position-y		[y pos]		in pixels

	set-position-y	[y pos]		in pixels
	get-width-user-sizeable		[true|false]	
	set-width-user-sizeabl	[true|false]		
	get-height-user-sizeable		[true|false]	
	set-height-user-sizeat	[true|false]		
	get-user-sizeable		[true|false] [true|false]	
	set-user-sizeable	[true|false] [true|false]		
	get-topmost		[true|false]	
	set-topmost	[true|false]		
	toggle-topmost		OK	
	get-background-color		#RRGGBB	RR, GG, and BB are hex digits
	set-background-color	#RRGGBB		RR, GG, and BB are hex digits
<TITLE>	get-title		[title]	text in title bar
	set-title	[title]		text in title bar
	get-title-text-justify		[LEFT|CENTER|RIGHT]	
	set-title-text-justify	[LEFT|CENTER|RIGHT]		
	get-title-text-color		#RRGGBB	RR, GG, and BB are hex digits
	set-title-text-color	#RRGGBB		RR, GG, and BB are hex digits
<TITLEBARIMAGE>	get-title-images		[url] [url] [url]	urls to normal, mouse over, and mouse button down title bar images
	set-title-images	[url] [url] [url]		urls to normal, mouse over, and mouse button down title bar images
	get-title-image-normal		[url]	url to normal image
	set-title-image-normal	[url]		url to normal image
	get-title-image-over		[url]	url to mouse over image
	set-title-image-over	[url]		url to mouse over image
	get-title-image-down		[url]	url to mouse down image
	set-title-image-down	[url]		url to mouse down image
	get-title-image-justify		[LEFT|CENTER|RIGHT]	if image not wide enough, position left, right or center?
	set-title-image-justify	[LEFT|CENTER|RIGHT]		if image not wide enough, position left, right or center?
	get-title-image-tile-widths		[#] [#]	if image not wide enough, use how many pixels from left & right to tile?
	set-title-image-tile-wid	[#] [#]		if image not wide enough, use how many pixels from left & right to tile?
	get-title-image-tile-width-left		[#]	left pixels to tile
	set-title-image-tile-wid	[#]		left pixels to tile
	get-title-image-tile-width-right		[#]	right pixels to tile
	set-title-image-tile-wid	[#]		right pixels to tile
<BOTTOMBARIMAGE>	get-bottom-images		[url] [url] [url]	normal, over, down
	set-bottom-images	[url] [url] [url]		normal, over, down
	get-bottom-image-normal		[url]	
	set-bottom-image-nori	[url]		
	get-bottom-image-over		[url]	
	set-bottom-image-ove	[url]		
	get-bottom-image-down		[url]	
	set-bottom-image-dow	[url]		
	get-bottom-image-justify		[LEFT|CENTER|RIGHT]	
	set-bottom-image-just	[LEFT|CENTER|RIGHT]		
	get-bottom-image-tile-widths		[#] [#]	
	set-bottom-image-tile-	[#] [#]		
	get-bottom-image-tile-width-left		[#]	

	set-bottom-image-tile-[#]			
	get-bottom-image-tile-width-right		[#]	
	set-bottom-image-tile-[#]			
<MENU>	get-menucheck	[id]	[true|false]	id starts at 1; non-persistent
	set-menucheck	[id] [true|false]	[OK|Err]	id starts at 1; non-persistent
<DOTDATA>	get-data	[name]	[data]	data may contain spaces
	set-data	[name] [data]		data may contain spaces
	open-get-dot			shouldn't be a dot message!
	open-nearby	[n|s|e|w|ne|se|nw|sw] [n|...] ...		opens dot near sender of message, trying compass directions in the order s
	open-nearby-dot			This is a NOP
	open-relative	[x] [y]		opens dot, positions (x,y) relative to top left of sender
	close		OK	
	delete		[OK|Err]	
	share		OK	
	alert		OK	opens the alert mgr dialog
	fix-url	[URL]	[URL]	rewrites URL to use dodots protocol
	add-to-layer	[dot address]	[OK|Err]	[dot address] is optional; layer management is non-persistent
	remove-from-layer	[dot address]	[OK|Err]	[dot address] is optional; layer management is non-persistent
	get-installed		[true|false]	is this dot installed in the homedot (as oposed to transient)
	set-installed	[true|false]	[OK|Err]	install or uninstall this dot in the homedot
	set-oncollapse			obsolete; use dot events
	set-onuncollapse			obsolete; use dot events

Control Commands

<CONTROL>	get-is-open		[true|false]	redundant?
	get-size		[x] [y]	
	get-width		[x]	
	get-height		[y]	
	get-address		[control address]	
	get-url		[url]	
	set-url	[url]		Same as navigate
	get-dotEventHandler		[javascript function name]	default is onDotEvent
	set-dotEventHandler	[javascript function name]	[old handler]	overrides default "onDotEvent"
	get-enabledDotEvents		[enabled Dot Events]	See **"Dot Event Names"** below
	show			shows the control
	hide			hides the control (not the dot)
	navigate	[url]		Same as set-url
	allow-scrollbars			let this (browser) control have scrollbars if needed
	disallow-scrollbars			don't let this (browser) control have scrollbars if needed
	enableDotEvents			enable some set of dot events. See **"Dot Event Names"** below
	disableDotEvents			disable some set of dot events. Sett **"Dot Event Names"** below

Dot Event Names

none
all
onopen
onclose
oninstall
onuninstall
onsend
oncollapse
onexpand
onresize
onresizestart
onresizeduring
onmove
onmovestart
onmoveduring
ongroupmove
ongroupmovestart
ongroupmoveduring
onpropertychange
onfocus
onblur
onmouseover
onmouseout
onmousedown
onmouseup
onprovideralert

Server API Catalogue (Jacob)

message name	website only	deprecated	maybe unused?	function category	web category	notes
cp	TRUE	FALSE	FALSE	account - credentials	web	Change password. After user submits forgot password, an email is sent with this servlet in the url. Clicking on the url directs user to a web page to change password.
doEcho	FALSE	FALSE	FALSE	account - credentials		
login	TRUE	FALSE	FALSE	account - credentials	web	Handles login for admins and developers, and displays the first page to the user, based on type, after successful login.
logout	TRUE	FALSE	FALSE	account - credentials	web	Handles web log outs for developers and admins. Basically just kills their session and
processadminlogin	TRUE	FALSE	FALSE	account - credentials	admin	Handles the request for a web based Admin zone login. Re-prompts for the login if
processcustzonelogin	TRUE	FALSE	FALSE	account - credentials	developers	Handles the request for a web based customer login. Re-prompts for the login if
processdevdotlogin	TRUE	FALSE	FALSE	account - credentials	devdot	Handles the request for a Dev Dot developer login. Re-prompts for the login if
processdevlogin	TRUE	FALSE	FALSE	account - credentials	developers	Handles the request for a web based developer login. Re-prompts for the login if
showadminlogin	TRUE	FALSE	FALSE	account - credentials	web	Just displays the admin login page if the user does not have a valid ADMIN session, otherwise, passes them on to processadminlogin.
showcustzonelogin	TRUE	FALSE	FALSE	account - credentials	web	Just displays the customer login page if the user does not have a valid CUSTOMER session, otherwise, passes them on to processcustomer login.
showdevlogin	TRUE	FALSE	FALSE	account - credentials	web	Just displays the developer login page if the user does not have a valid DEVELOPER session, otherwise, passes them on to processcustomer login.
showdevlogout	TRUE	FALSE	FALSE	account - credentials	developers	Displays the web log out message to people who log out of the developer zone. Kills the user's DEVELOPER session on the server.
showforgotpassword	TRUE	FALSE	TRUE	account - credentials	web	Displays and processes the forgot password form for the Developer Zone.
getAllConfig	FALSE	FALSE	FALSE	account - dot instances		
getallconfigabc	FALSE	FALSE	FALSE	account - dot instances		
setAllConfig	FALSE	FALSE	FALSE	account - dot instances		
setallconfigabc	FALSE	FALSE	FALSE	account - dot instances	homedot	Attempts to store a user's all config for pre-Jacob clients. This method is invoked by an ABC branded DotManager. It only differs from setAllConfig in the variable is looks for to determine if the server is in Forced Jacob upgrade mode. Added to maintain
windowsSync	FALSE	FALSE	FALSE	account - dot instances		
addcustomerdeveloper	TRUE	FALSE	FALSE	account - management	web	Request from customer to become a developer. Public access
addcustomerpartner	TRUE	FALSE	FALSE	account - management	web	Request from customer to become a partner. Public access
addcustomeruser	TRUE	FALSE	TRUE	account - management	web	Request from customer to become a dot user. Public access
addprovider	TRUE	FALSE	FALSE	account - management	web	Add a provider in admin zone
addUser	FALSE	FALSE	FALSE	account - management		
deleteprovider	TRUE	FALSE	FALSE	account - management	web	Delete a provider in admin zone.
deleteuser	TRUE	FALSE	FALSE	account - management	web	Delete a user in admin zone.
modifyprovider	TRUE	FALSE	FALSE	account - management	admin	Displays and processes a web based form that modifies and existing dot provide from
sendemailmodify	TRUE	FALSE	TRUE	account - management	admin	Sends an e-mail to the user you are modifying.
sendemailview	TRUE	FALSE	TRUE	account - management	admin	Sends an e-mail to the user you are viewing.
setPassword	FALSE	FALSE	FALSE	account - management		
setUser	FALSE	FALSE	FALSE	account - management		
usersearch	TRUE	FALSE	FALSE	account - management	admin	Displays and processes an Admin zone request to search for users. Passes request
usersearchresults	TRUE	FALSE	FALSE	account - management	admin	Displays the web based details of a user search request from the Admin zone. Can repeat or change search from this method also.
viewprovider	TRUE	FALSE	FALSE	account - management	admin	Displays the web based details of a provider in the Admin zone.
viewuser	TRUE	FALSE	FALSE	account - management	admin	Displays the web based details of a user in the Admin zone.

webadminadduser	TRUE	FALSE	FALSE	account - management	admin	Displays and processes a web based form for adding users in the Admin zone. The
webadminmodifyuser	TRUE	FALSE	FALSE	account - management	admin	Displays and processes a web based form for modifying users in the Admin zone. The form is pre-populated with the user's details.
sendemail	TRUE	TRUE	TRUE	account - management		Not in existence any more.
addprovideralert	TRUE	FALSE	FALSE	alerts	web	Add an alert for a dot template. Customer Zone access only
deleteprovideralert	TRUE	FALSE	FALSE	alerts	web	Delete an alert in Customer Zone
gatewayalert	TRUE	FALSE	FALSE	alerts		Provide a means for authenticated users to add / delete alerts programmatically for
getAlerts	FALSE	FALSE	FALSE	alerts		
listprovideralerts	TRUE	FALSE	FALSE	alerts	developers	Displays a web based table all of the alerts for a given provider. Provides access to
modifyprovideralert	TRUE	FALSE	FALSE	alerts	developers	Displays and processes a web form that modifies a provider's alert for a specific dot.
disableAutoLogin	FALSE	FALSE	FALSE	client utilities		
doRedir	FALSE	FALSE	FALSE	client utilities		
enableAutoLogin	FALSE	FALSE	FALSE	client utilities		
migrateUser	FALSE	FALSE	FALSE	client utilities		
redirect.ddw	FALSE	FALSE	FALSE	client utilities		
removeAutoUser	FALSE	FALSE	FALSE	client utilities		
share (receive)	FALSE	FALSE	FALSE	client utilities		in URL when email is received
getservertime	FALSE	TRUE	FALSE	client utilities		Not used Jacob+ Functionality is instead included in getsessionconfig in a new attribute SERVER_TIME. Returns an XML document with the current server time in
downloadhomedot	TRUE	FALSE	FALSE	client utilities - automatic application download	web	Redirects to download page after registering the download event. Called by install web pages
getSessionConfig	FALSE	FALSE	FALSE	master configuration		
forgothomedotpassword	TRUE	FALSE	FALSE	misc	homedot	Processes forgot password page shown in the homedot.
forgotpassword	TRUE	FALSE	FALSE	misc	web	Processes forgot password on the web page
getcookieimage	TRUE	FALSE	FALSE	misc	web	Sets a Homedot cookie on the user's computer and returns the image asked for.
getdotsdot	TRUE	FALSE	TRUE	misc		
adminpage	TRUE	FALSE	FALSE	misc - website	web	Log in user to admin zone.
areyousure	TRUE	FALSE	FALSE	misc - website	web	Verifies user input for category administration.
areyousureadmindot	TRUE	FALSE	FALSE	misc - website	web	Verifies user input for admin zone
areyousuredevdot	TRUE	FALSE	FALSE	misc - website	web	Verifies user input
areyousureprovider	TRUE	FALSE	FALSE	misc - website	web	Verifies user input
areyousureraw	TRUE	FALSE	FALSE	misc - website	web	Verifies user input
areyousureuser	TRUE	FALSE	FALSE	misc - website	web	Verifies user input
dofeedback	TRUE	FALSE	FALSE	misc - website	web	User feedback from web site. Public access
dofeedbackgeneral	TRUE	FALSE	FALSE	misc - website	homedot	User feedback from homedot.
dofeedbackimpressions	TRUE	FALSE	FALSE	misc - website	homedot	User feedback from homedot.
dofeedbackproblems	TRUE	FALSE	FALSE	misc - website	homedot	User feedback from homedot.
emailmodifyuser	TRUE	FALSE	TRUE	misc - website	web	Used from admin zone.
emailviewuser	TRUE	FALSE	TRUE	misc - website	web	Used from admin zone.
providersearch	TRUE	FALSE	FALSE	misc - website	admin	Displays and handles a web based provider search form. Passes request off to
providersearchresult	TRUE	FALSE	FALSE	misc - website	admin	Displays results of a provider search allowing access to modify specific providers. Allows another search request.
dogetgraph	TRUE	TRUE	FALSE	misc - website	stats	
emailuser	TRUE	TRUE	FALSE	misc - website		
partnerstats	TRUE	TRUE	FALSE	misc - website		Method was never put into use. Displays a web table of statistics, over a selectable time period, for the given user's dots, based on provider ID.

devdot	TRUE	FALSE	FALSE	misc - website - devdot	devdot	Displays login page for devdot.
devdotbottom	TRUE	FALSE	FALSE	misc - website - devdot	devdot	Adds a dot from devdot
devdotbottomadd	TRUE	FALSE	FALSE	misc - website - devdot	devdot	Adds a dot from devdot. This and the one above seem to be doing the same thing.
devdotbottomdel	TRUE	FALSE	FALSE	misc - website - devdot	devdot	Deletes a developer dot from devdot.
devdotbottommod	TRUE	FALSE	FALSE	misc - website - devdot	devdot	Modifies a developer dot from devdot.
devdotintro	TRUE	FALSE	FALSE	misc - website - devdot	devdot	Delivers a page to devdot
devdottop	TRUE	FALSE	FALSE	misc - website - devdot	devdot	Gets the developer dots to be shown in a drop down list.
devzoneapi	TRUE	FALSE	FALSE	misc - website - devdot		**New DevZone api:** API for new devzone functionality. Accessed by devzone site developed by MonteClara. Not in production yet.
dotlist	TRUE	FALSE	FALSE	misc - website - devdot	web	Displays list of dots owned by developer in devzone.
adjustloglevel	FALSE	FALSE	FALSE	server management	web	Adjust server log level dynamically
servepage	TRUE	FALSE	FALSE	server management	web	Simply parses and then displays a Webj page to the requesting user.
servletstats	TRUE	FALSE	FALSE	server management	web	Displays a stats page with some interesting stats about the DoDots' server.
stats	TRUE	FALSE	FALSE	server management	admin	Servlet that allows SELECT queries to be run on the database attached to the server for the purpose of gathering stats.
systemcheck	TRUE	FALSE	FALSE	server management	admin	Method which returns an XML document reporting the current status of this server. Used by the automatic monitoring systems to monitor the health of this app server.
serializetest	TRUE	TRUE	TRUE	server management		Used in early testing.
unserializetest	TRUE	TRUE	TRUE	server management		Used in early testing.
addShare	FALSE	FALSE	FALSE	shares		
cleanupshares	FALSE	FALSE	TRUE	shares	admin	Cleans up expired shares. Not used. Not accessible from anywhere. Meant to be used
getShare	FALSE	FALSE	FALSE	shares		
share (send)	FALSE	FALSE	FALSE	shares		
addcategory	TRUE	FALSE	FALSE	templates	web	Adds a new category that a dot template can belong to. For ex. Sports. Admin zone
adddot	TRUE	FALSE	FALSE	templates	web	Add a dot template definition in admin zone.
adddotpack	TRUE	FALSE	FALSE	templates	web	Add a dot pack template definition in devzone.
adddotwithxml	TRUE	FALSE	FALSE	templates	web	Add a dot template from web using XML input from user in admin zone.
categorylist	TRUE	FALSE	FALSE	templates	web	Lists all categories in admin zone.
categorypage	TRUE	FALSE	FALSE	templates	web	Displays dots in a category. Publicly accessible
categoryselect	TRUE	FALSE	FALSE	templates	web	Lists category dots in admin zone
categorytree	TRUE	FALSE	TRUE	templates	web	Lists categories in admin zone.
deleteadmindot	TRUE	FALSE	FALSE	templates	web	Delete a dot in admin zone
deletecategory	TRUE	FALSE	FALSE	templates	web	Delete a category in admin zone.
deletedevdot	TRUE	FALSE	FALSE	templates	web	Delete a dot in devzone.
deletedotpack	TRUE	FALSE	FALSE	templates	web	Delete a dotpack in devzone.
deletedottemplate	TRUE	FALSE	FALSE	templates	web	Delete a dot in admin zone.
devcategoryselect	TRUE	FALSE	TRUE	templates	web	Select a development category in devzone.
displaycategory	TRUE	FALSE	FALSE	templates	web	Displays sub-categories within a category. Admin zone access.
displaydots	TRUE	FALSE	FALSE	templates	web	Displays dots in admin zone
dotdetailpage	TRUE	FALSE	FALSE	templates	web	Dot details about a particular dot. Public access
getDotPackTemplate	FALSE	FALSE	FALSE	templates		
getDotTemplate	FALSE	FALSE	FALSE	templates		
modifycategory	TRUE	FALSE	FALSE	templates	admin	Displays and processes a web form to modify an existing web category in the Admin
modifydot	TRUE	FALSE	FALSE	templates	admin	Displays and processes the "HTML" version (not raw) of a form for "hand" modifying dot templates. Only accessible through the Admin zone.
modifydotpack	TRUE	FALSE	FALSE	templates	developers	Displays and processes a web based form for modification of an existing dot pack. Loads the dot pack's info into the form, and allows a developer to make changes to

modifydotwithxml	TRUE	FALSE	FALSE	templates	admin	Displays and processes the raw version of a form for hand modifying dot templates. Allows admins to modify the actual dot template XML document.
searchdots	TRUE	FALSE	FALSE	templates	admin	Displays and handles a web based form for searching for dot templates by name, company, or provider. Allows access to modification of the dot template(s) if found.
searchresultspage	TRUE	FALSE	FALSE	templates	web	Displays the web based results of a web search for dot templates. Allows another
setdotpackstate	TRUE	FALSE	FALSE	templates	developers	Processes a web form request to change a dot pack's state among DEVELOPMENT, PUBLIC, PUBLIC-INDEXED
showcategoryhierarchy	TRUE	FALSE	FALSE	templates	developers	Displays the category hierarchy as a web based list. Used for selecting categories for a dot. Note: After the DevDot, this is only used in the Admin zone.
showdotpackdetail	TRUE	FALSE	FALSE	templates	web	Displays the web based details of a dot pack template. Used from the Web based listing of dot packs in the Developer zone.
viewdot	TRUE	FALSE	FALSE	templates	admin	Displays the web based details of a dot template in the Admin zone.
yourdotpacklist	TRUE	FALSE	FALSE	templates	developers	Displays a web based listing of your dot pack templates in the Developer zone based
adddeveloperdot	TRUE	TRUE	FALSE	templates	web	Add a dot template definition in devzone.
modifydeveloperdot	TRUE	TRUE	TRUE	templates		Not in use since release of DevDot. Displays and processes a web form for developers to make dot template modifications. Form is pre-populated with a dot
popdescription	TRUE	TRUE	FALSE	templates		Method was never put into use. Used to display specific information about a dot template in a pop up web window from the provider stats page.
toggledotpackdevstate	TRUE	TRUE	TRUE	templates		Not in use since the release of the Dev Dot. Used to toggle the state of a dot pack template between DEVELOPMENT and PUBLIC.
yourdotlist	TRUE	TRUE	TRUE	templates		Not in user since the release of the Dev Dot. Displays a web based listing of all the dot templates associated with your provider ID.
homedotinstallcount	TRUE	FALSE	FALSE	tracking	web	Logs a DotManager download event in the DOT_USER_EVENTS table. Used as a part of the download sequence of the client.
setAllEvents	FALSE	FALSE	FALSE	tracking		

Last Updated 1/5/2001 by EDB

<DOT> XML Definition

<DOT>

<DOT>Attributes	Description
DOMAIN	Dot's Domain (string)
KIND	Dot's Kind (string)
DTID	Dot Template ID (string rep of integer)
NOTID	Notification ID (32 bytes max)
TRKID	Tracking ID (32 bytes max)
IS_ALERTABLE	Is provider alertable?
DUDID	Unique dot instance id
LAST_UPDATE	Token from server
OPEN	Is this dot open?
DOTIFYLINKS	Perform http -> dodots url conversion
TRKID	Tracking ID (32 bytes max)

[DOT/FRAME] (1 element)

<FRAME> Attributes	Description
NAME	Name in HomeDot
PIXELWIDTH	Width of Dot exterior-most frame in pixels. Overrides WIDTH.
PIXELHEIGHT	Height of Dot exterior-most frame in pixels. Overrides HEIGHT.
WIDTH	Dot Unit width to use if PIXELWIDTH is not present (or is -1).
HEIGHT	Dot Unit height ot use if PIXELHEIGHT is not present (or is -1).
COLLAPSED	TRUE or FALSE, indicating whether Dot is collapsed or not.
X	Pixel x of top left of Dot
Y	Pixel y of top left of DOT
FIXWIDTH	TRUE or FALSE, whether the Dot can be resized horizontally.
FIXHEIGHT	TRUE or FALSE, whether the Dot can be resized vertically.
TOPMOST	TRUE or FALSE, whether the Dot has the "topmost" property.

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BACKGROUNDCOLOR	#rrggbb, where rr, gg, & bb are hex values 00..FF

[DOT/FRAME/TITLE] (1 element)

<TITLE> Attributes	Description
JUSTIFY	LEFT, RIGHT, or CENTER. How to justify the title text overlay, if any.
TEXT	Optional text for titlebar of Dot. Also holds DATADOT info.
COLOR	#rrggbb color of title bar. rr, etc. are hex values 00..FF.

[DOT/FRAME/TITLE/TITLEBARIMAGE] (1 element)

<TITLEBARIMAGE> Attributes	Description
JUSTIFY	LEFT, RIGHT, or CENTER. Used when tiling
TILELEFT	pixels
TILERIGHT	pixels
NORMAL	URL to "normal" titlebar image
DOWN	URL to "mouse down" titlebar image
HOVER	URL to "mouse over" titlebar image
INACTIVE	URL to "inactive" titlebar image. UNUSED.

[DOT/FRAME/TITLE/BOTTOMBARIMAGE] (1 element)

<BOTTOMBARIMAGE> Attributes	Description
JUSTIFY	LEFT, RIGHT, or CENTER. Used when tiling.
TILELEFT	pixels
TILERIGHT	pixels
NORMAL	URL to "normal" bottom bar image
DOWN	URL to "mouse down" bottom bar image
HOVER	URL to "mouse over" title bar image
INACTIVE	URL to "inactive" title bar image. UNUSED.

[DOT/MENU] (1 element)

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[DOT/MENU/ITEM] (*n* elements; key = "ID")

<ITEM> Attributes	Description
TITLE	menu item text
TOOLTIP	string. UNUSED.
ICON	URL to GIF to use as menu itme bitmap
ID	string ID for addressing menu item

[DOT/MENU/ITEM/ACTION] (1 element)

<ACTION> Attributes	Description
RECIPIENT	Dot Address of object to invoke
MESSAGE	Dot Message to send to that object

[DOT/CONTROL_LAYOUT] (1 element)

<CONTROL_LAYOUT> Attributes	Description
WIDTH	Width of rectangle holding all controls, in pixels
HEIGHT	Height of rectangle holding all controls, in pixels
WIDTHSCALES	TRUE or FALSE.
HEIGHTSCALES	TRUE or FALSE.

[DOT/CONTROL_LAYOUT/CONTROL] (*n* elements; key = "CLASS")

<CONTROL> Attributes	Description
KIND	String. Part of its Dot address.
ID	String. Also part of its Dot address.
TOP	pixel top of control within its parent
LEFT	pixel left of control within its parent
WIDTH	pixel width of control
HEIGHT	pixel height of control
CLASS	"Browser" is the only accepted value, and it's actually ignored
URL	URL to navigate to (assumes browser control)
ALLOW_SCROLLBARS	TRUE or FALSE

[DOT/CATEGORIES] (0 or 1 element)

[DOT/CATEGORIES/CATEGORY] (*n* elements; key = "NAME")

<CATEGORY> Attributes	Description
NAME	Category name of category this Dot belong to

[DOT/EVENTS] (1 element)

[DOT/EVENTS/ONCLOSE] (1 element)

[DOT/EVENTS/ONCLOSE/ACTION_LIST] (1 element)

[DOT/EVENTS/ONCLOSE/ACTION_LIST/ACTION] (*n* elements; key = "RECIPIENT")

<ACTION> Attributes	Description
RECIPIENT	Dot Address to send message at ONCLOSE tim
MESSAGE	Message to send

[DOT/ALERT] (0 or 1 element)

<ALERT> Attributes	Description
IS_PREFSONLY	
ALERTID	
IS_PROVIDER	
T_WROTETHIS	

[DOT/ALERT/DATA] (1 element)

<DATA> Attributes	Description
NOTE	
START_DATE	
EXPIRATION	
MORE_TIMES	
IS_MUTED	
EVERY_N_SECS	
T_LASTFIRE	
PAYLOAD*	
MAX_STAGGERS*	
STAGGER_MINS*	
END_DATE*	
IS_ON**	
T_ONTIME**	
ALERT_TYPE	

NFREQUENCY
IS_WEEKDAY
DAYS_OF_WEEK
MONTHLY_NTH_DAY
YEARLY_MONTH

*** - attributes only appearing in provider alerts**

**** - attributes only appearing in user alerts**

[DOT/ALERT/DATA/START_HOUR] (1 element)

<START_HOUR> Attributes	Description
TIME	
IS_DISPLAY24	

[DOT/ALERT/DATA/END_HOUR] (1 element)

<END_HOUR> Attributes	Description
TIME	
IS_DISPLAY24	

[DOT/ALERT/PREFS] (1 element)

<PREFS> Attributes	Description
IS_OPENDOT	
IS_OPENDOTNOTE	
IS_OPENDOTONTOP	
IS_OPENDOTFLASH	
IS_NOTEBYSYSTRAY	
IS_PLAYSOUND	
SOUND	

[See "XML elements for saving and restoring Alert state as part of the Dot definition"]

[DOT/DOTPAKS] (0 or 1 element)

[DOT/DOTPAKS/PAK] (*n* elements; key = PAIR)

<PAK> Attributes	Description
NAME	Name of DotPak

X	X position of this dot when pak is applied
Y	Y position of this dot when pak is applied

[DOT/DOTDATA] (0 or 1 element)

[DOT/DOTDATA/PAIR] (*n* elements; key = PAIR)

<PAIR> Attributes	Description
NAME	Name of Name-Value pair
VAL	Value of Name-Value pair

DoDots™

Technology Details Patent Overview

10351-0002-999 **DODOTS PATENT APPLICATION STATUS REPORT**

DoDots Reference	Pennie Reference	Current Status	Application Title
#1	10351-0004-999	*FILED* Waiting for Initial Reponse from PTO	Apparatus and Method of Hosting Internet Content
#2	10351-0005-999	*FILED* Waiting for Initial Reponse from PTO	Apparatus and Method for Tracing the Distribution of Diversely Sourced Internet Content
#3	10351-0006-999	*FILED* Waiting for Initial Reponse from PTO	Apparatus and Method for Dynamically Coordinating the Delivery of Computer Readable Media
#4	10351-0007-999	*FILED* Waiting for Initial Reponse from PTO	Apparatus and Method for Interacting with Internet Content
#5	10351-0007-228	*FILED* PCT (foreign) Application: National Election Extension until 9/01	PCT Application (combining the first 4 applications)
#6	10351-0008-888	*BEING PREPARED (On hold)* P&E preparing formal application: Must be filed by 1/24/01	Music Dot Application
#7	10351-0009-888	*BEING PREPARED (On hold)* P&E preparing formal application: Must be filed by 1/24/01	Data Dot Application
#8	10351-0010-999	*FILED* P&E preparing formal application: To be filed in 11/00	Finance Dot Application (Visa Transaction Application)
#9	10351-0011-888	*NO ACTIVITY* No activity: Formal application not due until 9/5/01	Mobile-related Application (Provisional Filed before DemoMobile)
#10		*PREPARE DISCLOSURE* Rakesh preparing disclosure	Location-Based Application (from Salim)
#11		*PREPARE DISCLOSURE* Rakesh preparing disclosure	Apparatus and Method for Delivering Electronically Readable Media to a Mobile Electronic Device

APPARATUS AND METHOD FOR TRACING THE DISTRIBUTION OF DIVERSELY SOURCED INTERNET CONTENT

ABSTRACT

The invention includes a method of tracking distributed content within a computer network. The method includes the step of identifying the delivery of a set of Network Information Monitors (NIMs). Information about each NIM within the set of NIMs is tracked. The information includes a first time at which a user opens a selected NIM, a second time at which the user closes the selected NIM, and an identifier for the selected NIM. The information is used to determine sub-sets of NIMs that are displayed simultaneously. The invention also includes a method of identifyingthe delivery of a Network Information Monitor (NIM) to a user. Content information for the NIM is recorded. NIM use activity is tracked the user for a set of NIMs. The content information is correlated with the NIM use activity.

DDREF-2

APPARATUS AND METHOD OF HOSTING INTERNET CONTENT

ABSTRACT

The invention includes a method of hosting Internet content. The method includes the step of receiving an address of a definition from a computing device, where the definition defines a frame and a location of content with which to fill in the frame. The definition is located in a database utilizing the address. The definition is transmitted to the computing device. A method of the invention also includes permitting access to a database containing a set of definitions, where the set of definitions defines a frame and a location of content with which to fill in the frame. Instructions are received to modify a selected definition of the set of definitions. The selected definition is modified to create a new selected definition.

DDREF-1

APPARATUS AND METHOD FOR INTERACTING WITH INTERNET CONTENT

ABSTRACT

The invention includes a method of presenting distributable computer readable media to a user in response to a user request. The method comprises the steps of identifying a definition of a Networked Information Monitor (NIM). A NIM frame is defined for the NIM using the definition. Content is then retrieved for the NIM. Then, the content is placed in a NIM viewer defined by the frame. The invention also includes a method of altering a Networked Information Monitor (NIM). The method includes the step of receiving a message at a NIM. The message specifies a configurable feature of the NIM. The NIM is altered in accordance with the configurable feature of the message.

DDREF-4

APPARATUS AND METHOD FOR DYNAMICALLY COORDINATING THE DELIVERY OF COMPUTER READABLE MEDIA

ABSTRACT

The invention provides a method of processing distributable computer readable media in a client/server computer system in a manner specified by a user. The method includes the steps of providing a login construct to a client computer from a server computer. A server computer accepts a login identifier from the client computer that corresponds to the user. The login identifier is used to locate an unprocessed user profile associated with the login identifier in a user profile database when the unprocessed user profile exists. A home networked information monitor is delivered to the client computer in accordance with instructions in a processed user profile. The home networked information monitor is capable of accessing each networked information monitor associated with the login identifier. Each networked information monitor is capable of processing distributable computer readable media.

DDREF-3

COMMON BACKGROUND AND SUMMARY WITH FIGURE DESCRIPTIONS

*DDREF-**

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BACKGROUND OF THE INVENTION

A user operating a client computer typically accesses the Internet by using a viewer application, such as a browser to view web content provided at a destination address, typically a web page. In this context, web content and web applications are designed to fill the entire web page. It is known to divide the web content into different regions of a single web page. For example, personalized web pages can be specified, such that a user views a variety of content sources in a single page, such as stock information, weather information, and sports information, which is aggregated at the server that delivers the web page to the user, who then views the aggregated content in a single web page. Observe that even when disparate content is aggregated, in this manner, it is reassembled into a full web page and is served through a full-screen browser. Web content and application developers therefore have limited control over the user experience: content is typically trapped within the frame of the browser. A developer's only alternative to engaging a user page-by-page in a browser

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is to develop, distribute, and support custom client software. In the Web browser scenario, it is the content provider, not the user that aggregates the information that is viewed by the user. Thus, the user is not in a position to separately aggregate the content at a client computer, instead the user is constrained to view the content that has been delivered in the manner provided by the server computer hosting the web page. There is a growing desire for individual users to fully control the aggregation and presentation of content and web applications that appears on a client computer.

A user who wishes to view multiple web pages or applications can open multiple instances of a browser. However, the user will not be able to view each "full-screen" page at the same time. Instead, the user must adjust the windows corresponding to each browser instance and view only part of each page. The information appearing in each browser is not designed for viewing in this manner. Thus, the user cannot create an optimized display of content from multiple sources.

Currently, content providers and end users have limited tools to alter the browser in which content appears. That is, the controls associated with a browser are not fully configurable. Thus, the vendor of a browser is in a position to brand the browser and regulate the controls associated with the browser. There is a growing desire for content providers to not only fill a browser with their content, but to also fully brand and control the frame in which the content appears. Further, in some instances, content providers desire to limit the controls associated with a browser or viewer, so that a user is more inclined to view a single set of content, for example, by having limited access to previously viewed content.

At the present time, it is relatively difficult to trace the content viewing activity of a client computer. In other words, it is difficult to identify the type of content that a particular user of a client computer favors. Consequently, there are limited tools available to provide a user with tailored information that would be of particular interest to the user.

In view of the foregoing, there is a need in the art to provide a technique for accessing multiple instances of distributable computer readable media in their entirety simultaneously, where these instances are typically smaller than the full pages used in current web pages and web applications. There is a further need for providing the user with flexibility in selecting, collecting, relating and viewing such computer readable

media, and for giving the media provider flexibility in directing media to a specific user and controlling the framework in which media is presented. Finally, there is a need to gather more accurate information regarding the type of content that a user enjoys, so that the user can be automatically provided with this content.

SUMMARY OF THE INVENTION

The invention includes a method of processing distributable computer readable media in a client/server computer system in a manner specified by a user. The method includes the steps of providing a login construct to a client computer from a server computer. A server computer accepts a login identifier from the client computer that corresponds to the user. The login identifier is used to locate an unprocessed user profile associated with the login identifier in a user profile database when the unprocessed user profile exists. A new unprocessed user profile is associated with the login identifier when the unprocessed user profile does not exist. The unprocessed user profile is processed to form a processed user profile. The processed user profile includes a reference to each networked information monitor in the client/server computer system associated with the login identifier. One of the networked information monitors referenced in the user profile is a home networked information monitor. The home networked information monitor is delivered to the client computer in accordance with instructions in the processed user profile. The home networked information monitor is capable of accessing each networked information monitor associated with the login identifier. Each networked information monitor is capable of processing distributable computer readable media.

The invention also includes an apparatus in the form of a computer program product for use in conjunction with a server in a client/server computer system. The computer program product comprises a computer readable storage medium and a computer program mechanism embedded therein. The computer program mechanism comprises a login module that includes instructions to handle an entry request from a client computer and instructions to accept at a server computer a login identifier from the client computer that corresponds to a user. A login validation module includes instructions to use the login identifier to identify an unprocessed user profile that is associated with the login identifier in a user profile database when the unprocessed

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user profile exists and instructions to associate a new unprocessed user profile with the login identifier when the unprocessed user profile does not exist. A user profile processor module includes instructions to process the unprocessed user profile to form a processed user profile. The processed user profile includes a reference to each networked information monitor in the client/server computer system associated with the login identifier. One of the networked information monitors referenced in the processed user profile is a home networked information monitor. A delivery module includes instructions to deliver the home networked information monitor to the client computer in accordance with instructions in the processed user profile. The home networked information monitor is capable of accessing each networked information monitor associated with the login identifier. Each networked information monitor is capable of processing distributable computer readable media.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 illustrates a system for processing distributable computer readable media in accordance with one embodiment of the present invention;

FIGURE 2 shows exemplary processing steps used to initiate an instance of a home networked information monitor (NIM) using the apparatus of Figure 1;

FIGURE 3A illustrates a screen logo in accordance with one embodiment of the present invention;

FIGURE 3B illustrates a login construct in accordance with one embodiment of the present invention;

FIGURE 4 illustrates a set of visual manifestations corresponding to a collection of NIMs, including a home NIM;

FIGURE 5 illustrates a visual manifestation of a home NIM as well as a visual manifestation of a reference NIM that references additional NIMs;

FIGURE 6 illustrates how a NIM, referenced by the reference NIM of Figure 5, is added to a processed user profile in response to a designated keyboard entry sequence or mouse click;

FIGURE 7 illustrates how a NIM is shared with other users in accordance with an embodiment of the present invention;

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FIGURES 8A and 8B illustrate screen panels that facilitate the collection of the description of a set of designated NIMs into a pack;

FIGURE 9A illustrates how the relative position of visual manifestations that correspond to NIMs remains fixed when the visual manifestations are within a predetermined distance of each other;

FIGURE 9B illustrates a representative pack in accordance with the present invention;

FIGURES 10A,10B and 10C illustrate how a set of visual manifestations corresponding to a collection of NIMs is aligned against a boundary when a user selects the visual manifestations and pushes them against the boundary;

FIGURE 11 is a flow chart of the steps taken by a client to give a user access to a NIM where the user "collects" the NIM, in accordance with one embodiment of the invention;

FIGURE 12 is a flow chart of the steps taken by a client to present a NIM to a user, where the NIM has been "collected" previously by the user, in accordance with one embodiment of the invention;

FIGURE 13 illustrates a data structure for a NIM definition, stored in the NIM application server's template database or user profile database;

FIGURE 14 illustrates NMA message routing between NIMs and the message interface in the client parser application;

FIGURE 15 is a diagrammatic illustration of an embodiment of a NIM Management Module utilized in accordance with an embodiment of the invention;

FIGURE 16 is a diagrammatic illustration of an embodiment of the NIM Templates database utilized in accordance with an embodiment of the invention;

FIGURE 17 is an illustration of a main NIMIndex Web page used in accordance with an embodiment of the invention;

FIGURE 18 is an illustration of a single NIMIndex category used in accordance with an embodiment of the invention;

FIGURE 19 is an illustration of a full description of NIM content provided in accordance with an embodiment of the invention;

FIGURE 20 is an illustration of a Web page displayed to the user once the user has clicked to collect the NIM;

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FIGURE 21 is an illustration of the main home NIM graphical user interface used in accordance with an embodiment of the invention;

FIGURE 22 is an illustration of a "Get New NIM" graphical user interface that may be used in accordance with an embodiment of the invention;

FIGURE 23 is an illustration of a "More NIMs" graphical user interface representative of an embodiment of the invention;

FIGURE 24 is a diagrammatic illustration of the ShareLink database used in accordance with an embodiment of the invention;

FIGURE 25 is an illustration of a Share NIM's graphical user interface according to an embodiment of the invention;

FIGURE 26 is an illustration of the main DevZone Web page utilized in accordance with an embodiment of the invention;

FIGURE 27 is a partial view of a NIM modification web page utilized in accordance with an embodiment of the invention;

FIGURES 28A to 28D are graphical user interfaces of development NIMs (DevNIMs) utilized in accordance with an embodiment of the invention;

FIGURES 29A to 31B are illustrations of Administrative Zone (AdminZone) Web pages utilized in accordance with an embodiment of the invention;

FIGURE 32 illustrates an embodiment of an event log that may be used in accordance with an embodiment of the invention;

FIGURE 33 illustrates the tracking of events in an event log module in accordance with an embodiment of the invention;

FIGURE 34 illustrates a statistics database that may be used in accordance with an embodiment of the invention;

FIGURE 35 illustrates a statistical analysis module and a content analysis module that may be used in accordance with an embodiment of the invention; and

FIGURE 36 illustrates a content database that may be used in accordance with an embodiment of the invention;

FIGURE 37 illustrates a user account database that may be used in accordance with an embodiment of the invention.

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SAMPLE FIGURE

*DDREF-**

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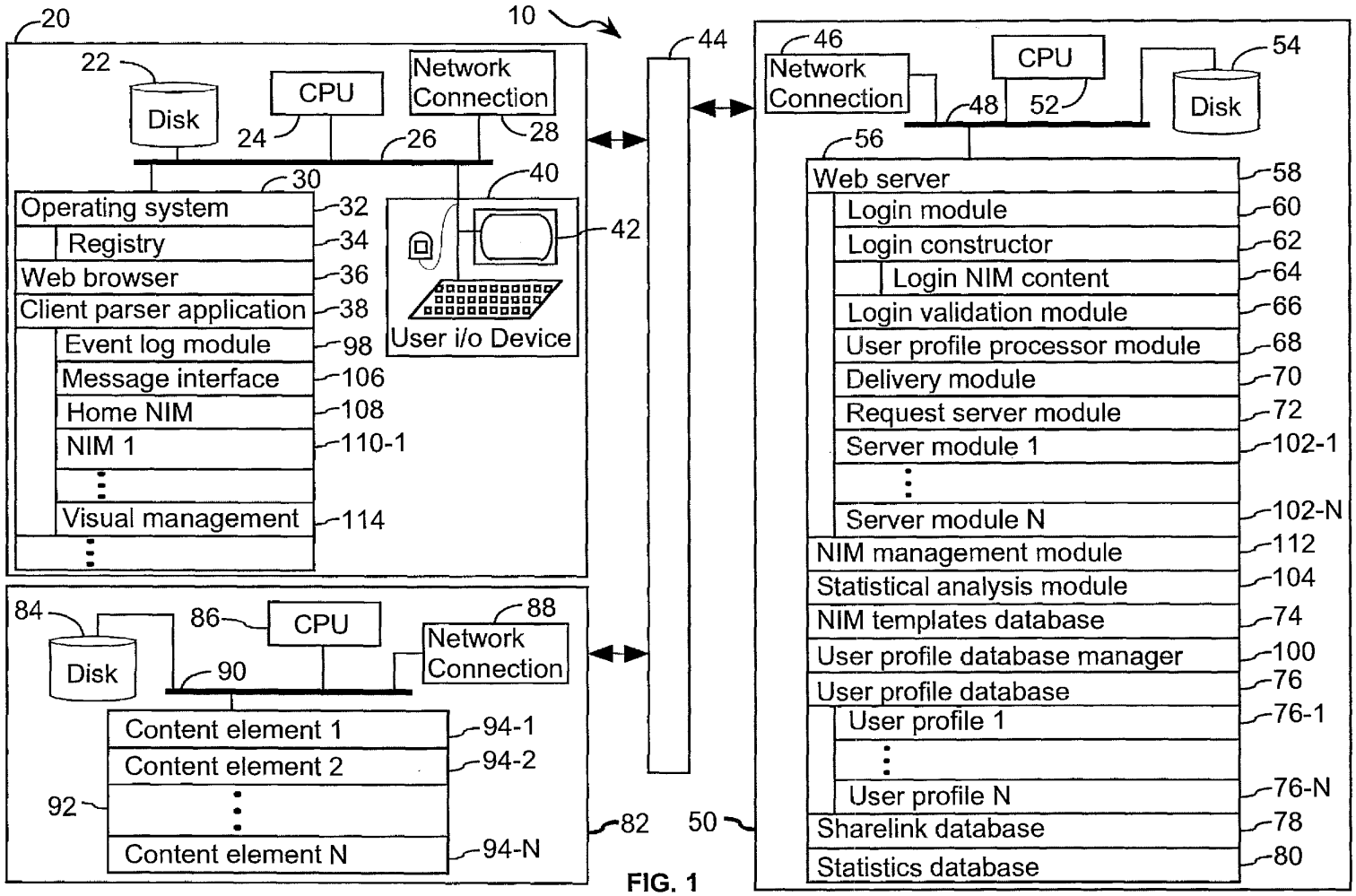

20
10
22
Disk
CPU
Network Connection
24
26
28
30
40
Operating system
32
Registry
34
Web browser
36
Client parser application
38
Event log module
98
Message interface
106
Home NIM
108
NIM 1
110-1
Visual management
114
User i/o Device
42
44
46
Network Connection
CPU
48
52
54
Disk
56
Web server
58
Login module
60
Login constructor
62
Login NIM content
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FIG. 1