Intel® Cloud Builders Guide
Intel® Xeon® Processor-based Servers
NetSuite and Gproxy Design

Intel® Cloud Builders Guide to Cloud Design and Deployment on Intel® Platforms

Integrated Cloud Applications Enterprise Portal with NetSuite and Gproxy Design

Intel® Xeon® Processor 5500 Series

Intel® Xeon® Processor 5600 Series

Audience and Purpose

Cloud computing offers a path to greater scalability and lower costs for service providers, infrastructure hosting companies, and large enterprises. However, building and using a cloud can be a daunting task. With its partners, Intel is providing reference architectures through the Intel® Cloud Builders Program, a starting point for building a cloud by providing a basic hardware and software blueprint.

Clouds are often used to deliver services to client devices, including desktop PCs, notebooks, phones, and tablets. IT Enterprises are seeking easier methods of using existing cloud applications, combining these into a common portal, and at the same time giving their end-users a quality experience that is optimized for their specific devices. This paper explores how the cloud can be used to deliver a combination of services in a way that adapts to specific client devices and optimizes the end user experience.

The Client-aware Enterprise Portal is the result of Intel's collaboration with NetSuite's Ecommerce Cloud platform and Gproxy's CLIDES (Client Device Score) online service. The usages described in this paper can be used as a baseline to build more complex usage and deployment models to meet specific customer needs.

The target audience of this paper is cloud service providers, enterprise and consumer ISVs, and enterprise IT departments that are looking to deploy a balanced Web solution using the capabilities of the end-client to deliver a rich end user experience. The paper introduces a set of publicly available Web APIs and design-in methodology.

Table of Contents

Audience and Purpose 1
Executive Summary 3
Introduction 3
Client-aware Cloud 3
Intel® Web APIs Design Methodology 5
ISV Product Implementation 6
Balance Compute Model Use Cases and Scenarios 6
Conclusion 11
Additional Information 11

Executive Summary

With the multitude of client devices flooding the market, cloud computing poses new questions about the optimal client strategy for enterprises and consumers. More and more applications and services are being delivered via a cloud based infrastructure, and users expect support across multiple devices. In many cases, users don't understand the difference in usage experience across devices. In addition, high-end 2D and 3D applications are coming to cloud business portals. The experience of watching high-end, high-bandwidth consuming videos on lesser capable devices is not user-friendly.

Intel, working with NetSuite and Gproxy, found that an enhanced user experience can be delivered through a more balanced compute model, in which a client provides some of the computing resources for running a Web application. Whether used for private or public cloud-hosted services, this new model achieves significant performance benefits in terms of screen refresh rates. In addition to delivering optimal user experience and interfaces, more capable client devices often provide for mobility and support a variety of service delivery models.

The example cloud implementation presented here consists of a PC using 2nd Generation Intel® Core™ I5-2500 processors operating at 3.3 GHz, the Intel® Pentium® M platform operating at 1.60 GHz, and Intel® Xeon® processor 7500 series-based servers. The software stack consists of two Web applications, Gproxy's CLIDES (Client Device Score) platform and NetSuite Ecommerce Cloud platform, and Intel® Web APIs, tested on several Internet browsers.

Introduction

The emergence of cloud-based services and the consumerization of IT provide a wide variety of users and usage options to both business and consumer end users. Web developers are increasingly taking advantage of rich media and graphics-intensive applications to attract users and present the best possible Web experience. If cloud computing is equated with the use of a less-capable, or "thin" client, the experience demanded by the users will degrade, limiting a cloud service provider's ability to differentiate their offering.

This paper highlights a scenario where an enterprise dashboard is used to access multiple cloud-based applications. This demonstration features a business portal through which a user accesses multiple Web-based business and collaboration applications including video training, interactive conferencing, Twitter, and data modeling applications. Each application snaps into the business portal interface.

The business portal functions as integrator of cloud-based services, allowing simultaneous access via a "single pane of glass." Applications accessible via the portal demo include HD video playback, video conferencing, sales forecasting and modeling, a calendar and Twitter. This application could just as easily display live video conferencing by using Google Talk or another application of the company's choosing. Applications like Salesforce.com, Facebook, Google Talk, MSN Live, or others could easily plug into a common portal such as being demonstrated here.

Client-aware Cloud

More capable clients can combine performance, connectivity, and security to optimize the end-user experience. Local execution provides the performance needed for applications that require rich graphics and second generation media, optimizing resource utilization and improving the end user experience. PCs based on Intel® Core™ vPro™ processors can enable applications to execute on the endpoint while also taking advantage of hardware-based mechanisms that enhance both device assurance and security.

Intel has introduced a series of Web APIs that allow Web developers to assess the capabilities of the client. Using a tool such as Gproxy's development environment on the NetSuite Ecommerce Cloud platform, developers can enable these Web APIs in their Web applications. As a result of enabling, the application is able to obtain information about the client capabilities to optimize both the end-user experience and application delivery. Developers can also provide a cloud-based linkage of data and services across a range of devices from an Intel-based PC to a tablet to a handheld for anytime, anywhere flexibility (see Figure 1).

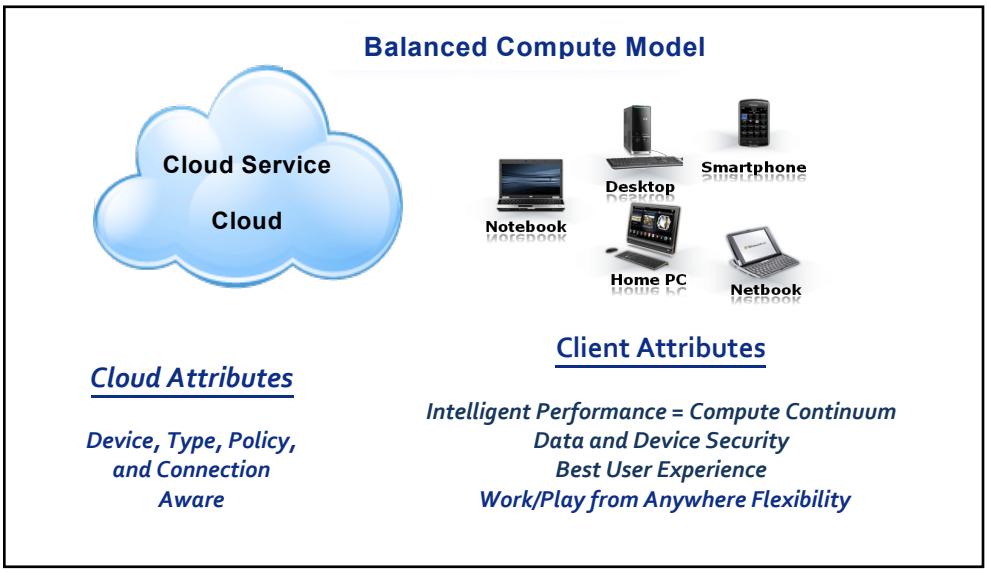


Figure 1: Client-aware Cloud Framework

Figure 2 below illustrates the reference architecture showcased in this paper. The Web servers are provided by Gproxy and NetSuite.

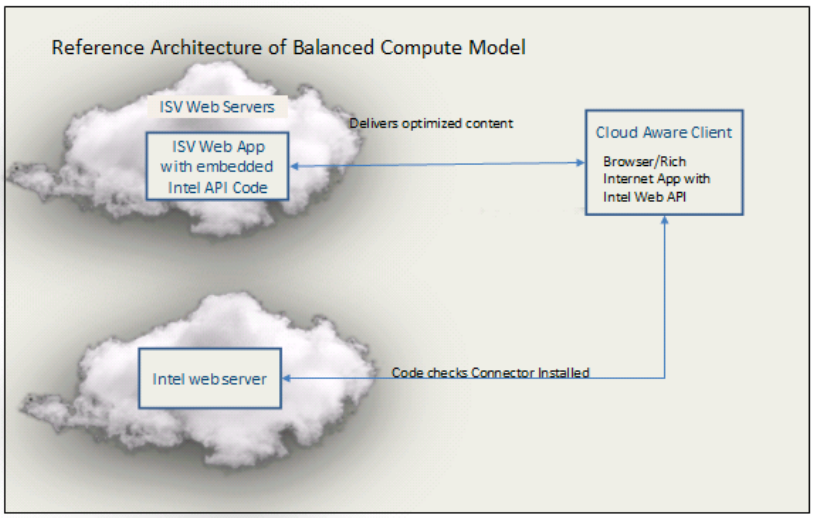


Figure 2: Reference Architecture of a Balanced Compute Model

Intel® Web APIs Design Methodology

The Intel Web APIs enable Web applications to detect endpoint information including CPU, battery life, and network connection. Developers can easily integrate these APIs using existing Web development tools to help websites avoid common pitfalls by providing more platform context. An example of this is the beta site www.gproxybusinessportal.com, powered by the NetSuite Ecommerce Cloud platform. The Intel Web APIs connect the JavaScript APIs to native browser plug-ins and also use the Intel Web API Connector to seamlessly install APIs and keep them updated over the Web.

Figure 3 shows how the APIs are deployed, and Table 1 provides usage models and links.

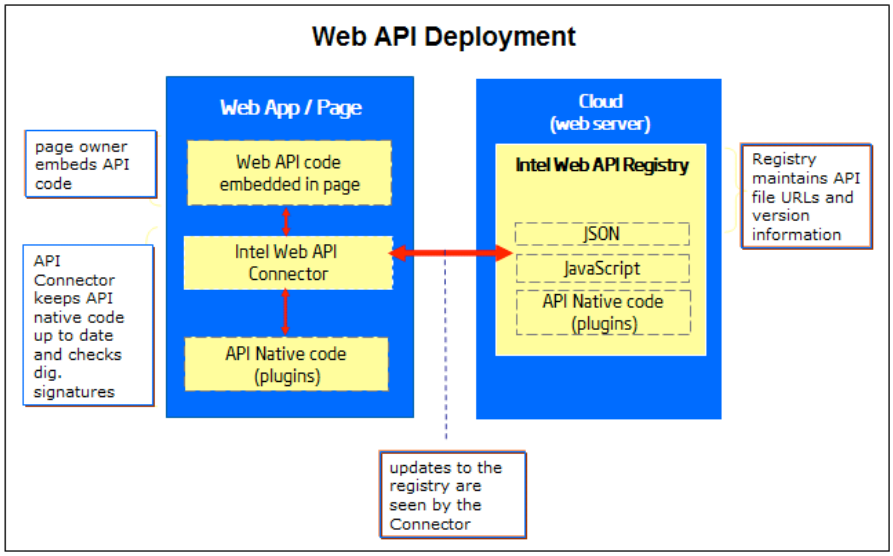


Figure 3: Client/Cloud Web API Architecture

API/Widget	Usage
CPU API	Detect the CPU type and only display content that can be displayed or decoded optimally on that CPU. For example, less-powerful CPUs may only be able to decode 480p video whereas more powerful CPUs can decode 1080p. http://software.intel.com/en-us/articles/intel-cpu-web-api-documentation-and-examples
CPU, Power, and Connection Indicator Widget	Web apps can receive periodic updates about CPU load, battery power level, and network signal strength. An application may wish to avoid having a user start a long-running task if the battery level is too low, or instruct the user to find wall power. http://software.intel.com/sites/whatif/webapis/widget/cpc/
Connection API	Web apps can detect current wireless network signal strength. If signal strength is poor, the application might use lower-quality content or suggest to the user that they move to a location with better signal strength. http://software.intel.com/sites/whatif/webapis/api/connection/

Table 1: Examples of Usage Models

ISV Product Implementation Overview

Client Device Score (CLIDES) by Gproxy

CLIDES, or Client Device Score, ranks a client device's capabilities, including CPU, CPU load, connection type (LAN or Wi-Fi), bandwidth, and screen resolution (see Figure 4). This score is key to enabling cloud services that are client-aware applications, and to optimizing the user experience based on the compute, context, and capabilities of the client device.

A demo of CLIDES is available on www.gproxybusinessportal.com. Developers can experience how simple criteria like the CPU name can be used to improve a user's experience according to the CPU's performance capabilities. For example, a user can experience HD-quality video from a website if CLIDES determines that the system CPU name contains "Core."[1]

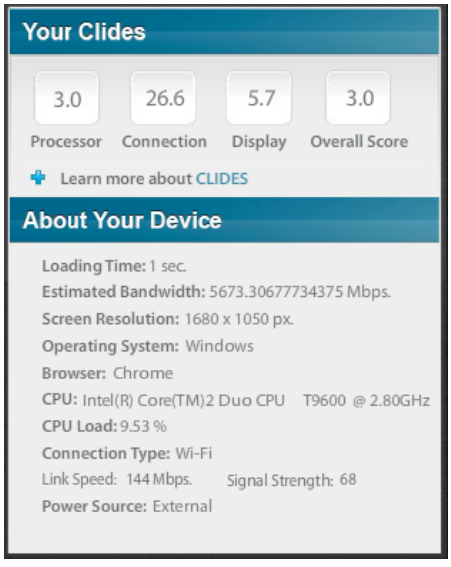


Figure 4: CLIDES Web Portal

NetSuite Ecommerce Cloud Platform

Gproxy's demo site www.gproxybusinessportal.com uses the NetSuite Ecommerce Cloud platform, which offers retailers a comprehensive system that incorporates not only the shopping cart, but Web analytics, online marketing, customer self-service, inventory management, complex pricing, product catalog, payment processing, and shipping integration (see Figure 5). Specific features used in this reference architecture are the Web store, shopping cart, and Web analytics.

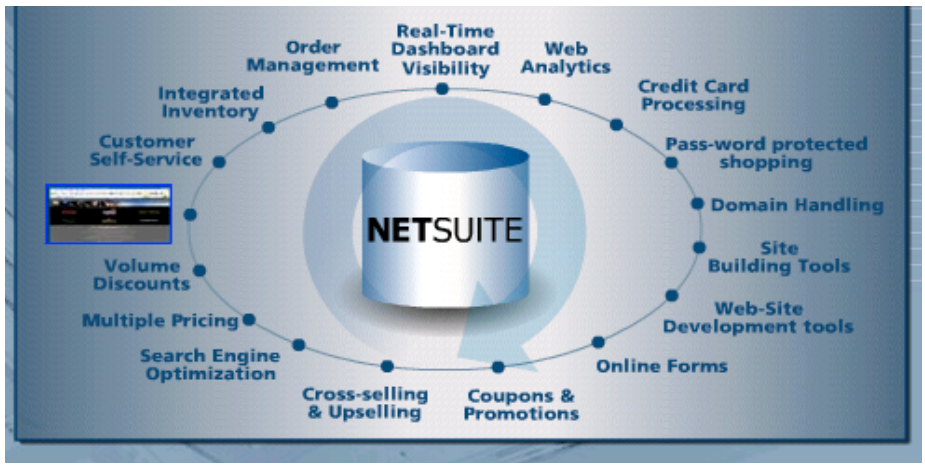


Figure 5: NetSuite Cloud Capabilities

Balanced Compute Model Use Cases and Scenarios

Use Case: Enabling Multi-platform Design and Cloud Portal Integration

As high-end 2D and 3D applications are being introduced in IT Enterprise portals, Web developers can take advantage of a client's specific hardware and connection configurations to customize user interfaces and experiences. This paper highlights a scenario where an enterprise dashboard is used to access multiple cloud-based applications. This is an implementation where a user accesses multiple Web-based business and collaboration applications including video training, interactive conferencing, Twitter, and data modeling applications. Each application snaps into the business portal interface.

Gproxy offers two user interfaces for this business portal, the "Standard" and "High." Both interfaces are hosted in the NetSuite Cloud and use the same data.

The standard version was designed in HTML5 to be used in devices with low processing capacity, unknown devices, or in low bandwidth environments. This version provides 2D real time graphs, 480p video, live news feeds, and basic data input. In this standard UI version, the client device does a little processing work of rendering and refresh.

The higher resolution version was designed in Flash to be used with client devices with faster CPU performance and higher capacity video processing devices. With this version, the user receives a rich Internet application with 3D graphs, HD Video up to 1080p, live video conferencing, enhanced data input, and real time updates in the feeds, calendar

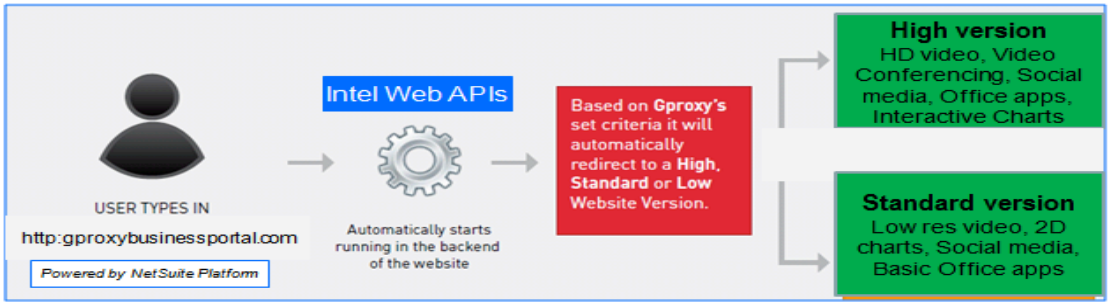


Figure 6: Typical Usage Flow – Interactive Content (using Intel Web APIs)

and graphs. With the higher resolution version, the client device plays a more active role in delivering the cloud service as it does more processing work including rendering HD video, 3D graphs, video chat, embedded entry forms, and additional content refresh.

The following detailed steps discuss how Gproxy's Web application development team has used standard tools and Intel Web APIs to deliver a smart application with two UIs - Standard and High:

1. Select an IDE; in this case Dreamweaver and Eclipse were selected.
2. Select the specs of each UI you plan to develop – Rich UI for high end devices, and Standard UI for other devices. Specify the feature differentiation ahead of time. Example is 1080p HD video will be deployed for High, and Low Resolution 480p video will be deployed for Standard version.
3. Develop the User Interfaces. Gproxy used HTML5 for the Standard version, and used Adobe Flash10 for the High version.
4. Install CLIDES script on the HTML code. CLIDES uses the Intel Web APIs and the script returns a number "score" for each device capability like Display, Connection, CPU.
5. Based on the number returned by CLIDES, Gproxy used a custom script (HTML) to detect which UI will be streamed to the browser in www.GproxyBusinessPortal.com. Policy could be based on a number of metrics, including a combination of processor type (in this case "Core"), power remaining and the network connectivity.
6. Connect the UI with the cloud database using the platform protocols. In this case, HTML/JavaScript and NetSuite SuiteScript were used to interact between the UI and the back-end.
7. Test on different browsers (Mozilla, Chrome, Safari, Explorer) and different devices (Desktops, Laptops, Tablets, Phones based on x86 architecture).

Note that CLIDES helps the developers as this service process the Intel Web APIs and returns numbers in a simple script this reduce the time and steps needed to make a decision about what data or UI will be delivered, however a developer can use the raw Intel Web APIs data in other way if they want.

Intel Web API Reference Guide

Intel Web APIs allow the use of JavaScript and HTML to access more features of the device on which a Web application runs. In these pages, you will find JavaScript APIs, embeddable widgets, and mashup demos to help you enable richer Web applications (see Figure 7). Supported Web browsers include Firefox 3.5.x +, Chrome 4.x +, Safari 4.x +, Internet Explorer 8.x + (Compatibility View OFF), Opera 10.x +, and SeaMonkey 2.x +.

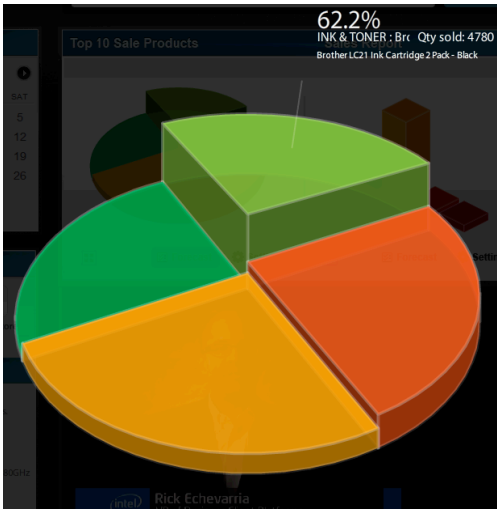
```
<div id="cpci_div"></div>
<script type="text/javascript"
src="http://software.intel.com/sites/whatif/webapis/intelwebapis.js"></script>
<script type="text/javascript"
src="http://software.intel.com/sites/whatif/webapis/widget/cpc/IntelCPCIWidget.js"></script>
<script type="text/javascript">
(function() {
//modified update interval - updates every 1 second instead of default 5
var theIntelCpciInst = new IntelCPCIWidget('cpci_div',{'updateInt':1});
})();
</script>
```

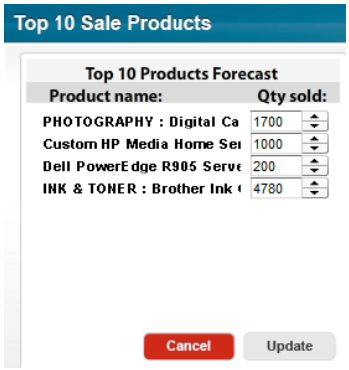
Figure 7: Example of Embedding the API Widget Code into a Web Application

An example of a High version of a website is shown below:

When a user accesses the Client-aware portal webpage from a particular device, the Gproxy engine is able to determine the attributes of the device based on information attained from the Intel Web APIs and browser. Higher-end devices will be streamed this High version as they are capable of supporting delivery of a more rich and optimized experience. This page can be accessed from http://www.gproxybusinessportal.com/?version=high. Characteristics of this version are:

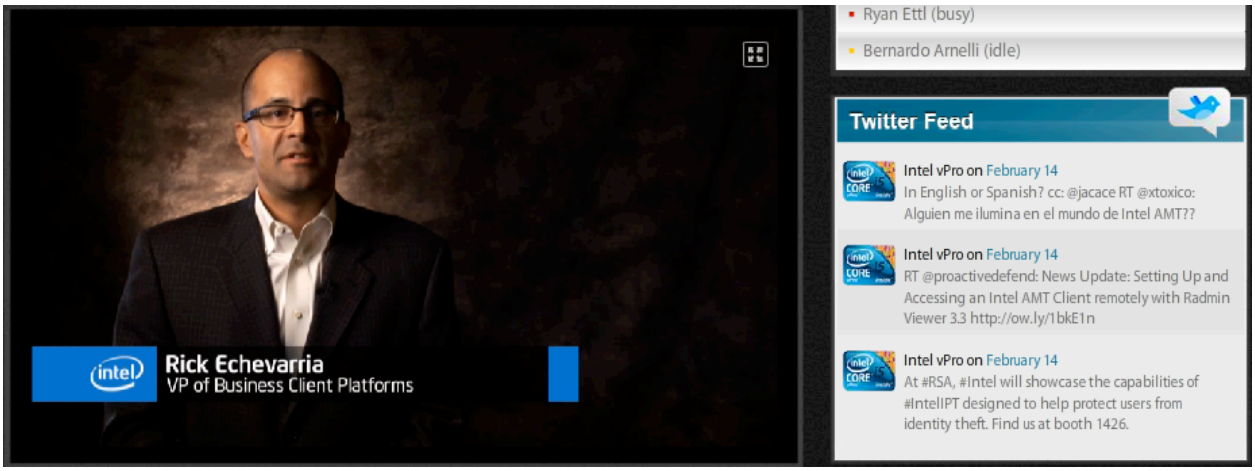
1. Sales modeling: This feature displays Interactive 3D graphs based data provided by Netsuite CRM backend. The portal allows the user to track and manipulate sales data on a real time basis. Changes to sales data through the high-end Gproxy business portal are automatically updated to a NetSuite ERP/CRM. With the PC using the 2nd Generation Intel Core Processor, sales data can be manipulated in real time with the results displayed via an interactive 3D pie chart and bar chart. The way this particular application is written, sales data cannot be updated when access the application via the lower-end machine. A less capable client may also have lesser security features enabled, and the ability to update/write data might have been removed.



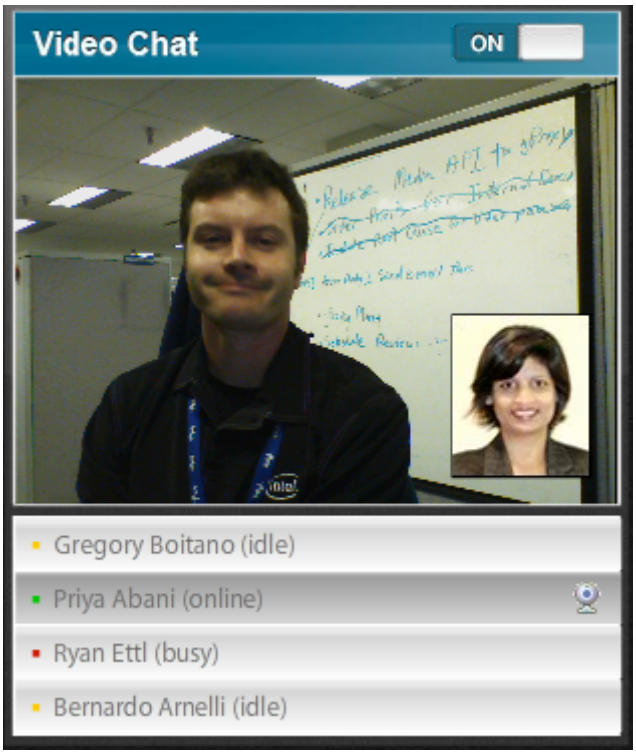


2. HDvVideo streaming: The flash based HD video can be used to support applications such as training videos. With the PC featuring the 2nd Generation Intel Core Processor, the video loads and begins playing in a matter of seconds. It runs at a full 1080P, playback is crisp and smooth and the user can expand to full screen. On the older PC, the video is delayed as it takes far longer to load and plays a lower resolution. The processing power on the PC with the 2nd Generation Intel Core Processor is about 13 times faster than with an Intel Pentium M processor. Overall system performance with the 2nd Generation Intel Core Processor is 78.8 percent faster, with a 13.78 percent decrease in power consumption.

3. Calendar and Twitter



4. Video conferencing: This feature is available with picture-in-a-picture capability on PCs but is not accessible on devices with lower performing processors.



Conclusion

Enabling cloud applications to be client-aware increases the opportunity forbusinesses to deliver a more robust and differentiated Web experiences to their customers. Taking advantage of client performance, security, and communication capabilities enable the service provider to deliver a better end-user experience and greater flexibility. Developers can design Web applications for a single client or create services across multiple devices to enable a compute continuum.

Intel Web APIs combined with Gproxy's development tools on the NetSuite Ecommerce Cloud platform is one way Web developers can create better user interfaces using the capabilities of the client device. Businesses also benefit, with the ability to differentiate their site from other Web offerings. Finally, service providers can improve the end-user experience by taking advantage of the capabilities of the local device to cost effectively deliver increasingly rich media.

Additional Information

Intel® Cloud Builders:
http://www.intel.com/cloudbuilders/

Intel® Xeon® processors:
http://www.intel.com/itcenter/products/xeon/index.htm

2nd Generation Intel® Core™ Processors:
http://www.intel.com/consumer/products/processors/core-family.htm

Intel Laptops and Desktops:
http://www.intel.com/itcenter/system/client/index.htm

Intel® Web APIs:
http://software.intel.com/sites/whatif/webapis/

NetSuite:
www.netsuite.com

CLIDES:
www.clides.net

Gproxy:
www.gproxy.com

Endnotes

1. Note: Intel Web APIs must be used with CLIDES to produce a complete scorecard. Otherwise, only partial information will be provided. For more information about CLIDES, visit http://www.clides.net

Disclaimers

Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See www.intel.com/products/processor_number for details.

Hyper-Threading Technology requires a computer system with an Intel processor supporting Hyper-Threading Technology and an HT Technology enabled chipset, BIOS and operating system. Performance will vary depending on the specific hardware and software you use. See http://www.intel.com/info/hyperthreading/ for more information including details on which processors support HT Technology.

Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

No computer system can provide absolute security under all conditions. Intel® Trusted Execution Technology (Intel® TXT) requires a computer system with Intel® Virtualization Technology, an Intel TXT-enabled processor, chipset, BIOS, Authenticated Code Modules and an Intel TXT-compatible measured launched environment (MLE). The MLE could consist of a virtual machine monitor, an OS or an application. In addition, Intel TXT requires the system to contain a TPM v1.2, as defined by the Trusted Computing Group and specific software for some uses. For more information, see http://www.intel.com/technology/security/

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