Human Presence Detection & Management

This Dell Whitepaper addresses the concept of non-intrusive human presence detection on commercial systems, with leverage towards consumer systems. It also summarizes key concepts of application of human presence determinations towards session & system management functionality.

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Executive summary

As Information Handling Systems (IHSs) become more intelligent, the ability to maintain or improve the key commercial tenets of Dell of most manageable, most secure and most intelligent without compromise becomes essential as a North Star Direction. A key aspect to this ability is the concept of the IHS being context-aware to attributes tied to user such as persona, compute usage, habits, and attributes tied to environment such as ambient brightness, location.

Non-intrusive Human Presence Detection (HPD) & management of HPD determinations toward session & system management functionality are critical to this overall north star direction.

In this whitepaper, we discuss the first HPD functionality launch with “Dell ExpressSign-In” on the Dell Latitude 7400 2-in-1.

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Introduction

With the launch of the Dell Latitude 7400 2-in-1, Dell introduced the industry's first proximity sensor based solution to accurately detect human presence in front of the PC, based on Intel Context Sensing Technology.

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Non-intrusive Human Presence Detection (HPD) & management of HPD determinations toward session & system management functionality are critical to this overall North Star direction.

With the launch of the Dell Latitude 7400 2-in-1, Dell introduced the industry's first proximity sensor-based solution to accurately detect human presence in front of the PC, based on Intel ® Context Sensing Technology.

This technology allows for the PC to accurately detect a human in close range and provide robust alerting mechanisms to initiate system protections and wake events based on user arrivals or departures.

Dell ExpressSign-In

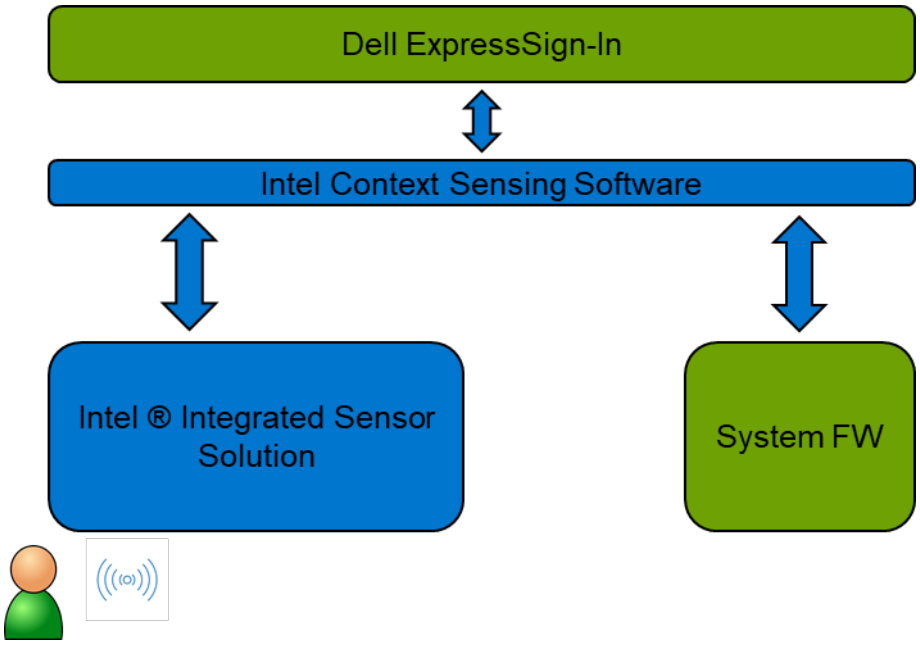
Dell ExpressSign-In is the first solution provided by Dell based on the integrated PC proximity sensor built into the Dell 7400 2-in-1 laptop. Dell ExpressSign-In is a Dell developed Windows application which enables a feature set to detect human presence and, when used in conjunction with Windows Hello face authentication, provides a touchless wake from modern standby and login experience. Additionally, Dell ExpressSign-In provides the capability to detect user departure and extend battery life by dimming and locking the system automatically.

Dell ExpressSign-In utilizes human presence detection via an infrared based time of flight sensor connected to the Dell 7400 2-in-1 chipset. This sensor and associated firmware logic provides notification when a user has entered or exited the field of view of the sensor.

Dell ExpressSign-In System Architecture

Below is the high-level software architecture implemented to enable human proximity detection within the ExpressSign-In software application.

Figure 1. Dell ExpressSign-In Software Architecture



Dell Express Sign-In Features

ExpressSign-In provides two main features in the Dell 7400 2-in-1 solution:

- Wake on Approach (Near) : WOA
- Walk Away Lock (Away) : WAL

Wake on Approach (Near) : WOA

Wake on Approach (WOA) provides a seamless method for user to wake their laptop up from modern standby sleep and login without physically interacting with the laptop. This experience allows for responsiveness and optimized time to productivity unseen by the market.

Here is an outline of how this works:

1. System is in Modern Standby sleep state
2. User walks into field of view of laptop
3. Proximity sensor in laptop detects user
4. Laptop wakes up from modern standby
5. When enabled with Windows Hello using biometric facial authentication, the user will be logged in seamlessly without system interaction

Walk Away Lock (Away): WAL

Walk away Lock enables the PC to automatically lock the laptop when the user has left the field of view for a reasonable time. This experience increases security by not relying on arbitrarily long timer values to lock the laptop and increases usable battery life by disabling the laptop screen when the user is not in front of the screen.

Here is an outline of how this works:

1. User is in front of the laptop
2. User walks away from the laptop
3. Proximity sensor detects that user is not in front of the laptop for reasonable time
4. Laptop turns display off and locks the desktop

Dell ExpressSign-In Solution Details

The solution works as a combination of the following processing elements to enable Dell ExpressSign-In behaviors:

1. Enhanced operating logic implemented within the Intel Integrated Sensor Solution
2. Intel Context Sensing Technology middleware software, and
3. Dell system BIOS

Human presence detection is optimized to ensure that users are adequately detected and office objects do not inappropriately alert the HPD logic.

- Object detection: if an object is detected, but it is not moving at a sufficient amount, the sensor will focus to ensure that the object being detected is not a human. After some defined time, if the object has not moved, the sensor will determine the object is not a human and alert the application that the user is no longer present.
- System Orientation: Due to hardware configurations, human proximity detection logic is only enabled when in certain platform modes. Below is the table for Dell Latitude 7400 2-in-1

Platform Description	Supported hinge angle	Dell Latitude 7400 2-in-1 Image
Clamshell	60˚ to 150˚	

Platform Description	Supported hinge angle	Dell Latitude 7400 2-in-1 Image
Stand	210˚ to 300˚	
Tablet	Not supported	
Tent	Not supported	

Wake on Approach (Near) Details

Wake on Approach (WOA) is implemented in such a way that it will only wake the system when the system has a sufficient battery level.

In order to provide the fastest response time, any new movement in front of the proximity sensor will initiate a wake from modern standby sleep state. This may introduce false wake events in a busy work environment or even possibly trigger detection when pets are around.

Walk Away Lock (Away) Details

Walk away lock optimizations are vital to ensure that the user is no longer engaged with the system. The walk away lock logic leverages not only user detection, but also user system interaction to ensure that no usage is present.

The following are some system characteristics which will impact the logic to enable walk away lock:

- User interaction (mouse, keyboard, etc.): if the user is not detected but providing user input, the application logic will halt walk away lock and system interaction functions.
- Application usage (Microsoft PowerPoint ™, etc.): if the user is detected in a presentation environment, the application logic will halt away lock and system interaction functions.
- Video playback: if a video is detected as being played and the user is not detected, the application will not initiate walk away logic assuming that the user is beyond the current field of view
- External Monitor detection: if an external monitor is detected, the application will allow the user to disable the Walk away Lock functionality. This will allow the user to configure thier laptop in a customized manner and not mandate the laptop to be oriented directly to the user.

Frequently Asked Questions

1. Will Dell ExpressSign-in log me in to Windows using Hello as part of WOA when I am determined to be present?
    a. No. Dell ExpressSign-in will bring the system out of modern standby and bring up the Win Hello login screen.

2. How long will it be from the time I walk away before Dell ExpressSign-in locks the computer as part of WAL?
    a. This is customizable, defaulted at 30 seconds currently.

3. Does Dell ExpressSign-in have any sensitivity to ambient conditions such as light, heat et cetera?
    a. Yes, direct sunlight on the IR TOF sensor and/or certain ambient lighting conditions may affect performance. Please contact us for more information.

Summary

With the introduction of the human proximity detection solution, enabled by Dell ExpressSign-In, the foundation of modern experiences for IHSs is upon us. The ability to influence an IHS's behavior based on intelligently and reliably detecting the user's physical presence will ensure Dell Commercial IHSs are most secure, most manageable and most intelligently optimized.

Learn more

Visit here for more information on Dell ExpressSign-In for Dell Latitude 7400 2-in-1.

About the authors

Dan Hamlin is a BIOS and Software Architect at Dell working with customers on the Strategy, Planning and Enterprise Architecture levels related to Mobility. Dan has 20 years of experience providing innovative technology solutions, operations support, and consulting for Dell and Dell's customers. Dan is a Distinguished Member of Technical Staff in the Technical Leadership Community at Dell.

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