

Solution Brief

Video Analytics
Artificial Intelligence



Improving Customer Experiences and Environmental Monitoring Operations through The Intel Processor-Powered WaitTime Crowd Management Platform

Built on Intel® Xeon® and Core™ Processors and optimized by the Intel® oneAPI Analytics Toolkit, the WaitTime computer-vision based solution helps facilities of all sizes convert assumptions into data driven insights. This helps facility managers optimize and monetize successful operations and improve guest experiences.

WaitTime

About WaitTime

Founded in 2013, WaitTime has been pioneering computer vision-based crowd-management since the modern industry's infancy. WaitTime provides real-time crowd science focused AI software to some of the world's largest event centers and institutions to help streamline operations, optimize occupancy management, and enhance guest experience.

Managing Crowd Behavioral Analytics, Insights, and Communications: What Exactly Is WaitTime and Why Is It So Unique?

The challenges to operating crowd management platforms and solutions are numerous. Anywhere large groups of people gather, anything can happen – from natural disasters and parking lot accidents to timeless moments with family, and lifetime experiences. With so much at stake, large venues and commercial real-estate vendors need a diverse range of tools that are also narrow enough to address their specific challenges.

WaitTime is an AI-powered crowd analytics solution designed to help companies manage crowds and queues in real-time and improve situational monitoring capabilities for venues such as major entertainment and sports facilities, amusement parks, convention centers, arenas, event venues, and mobile or temporary events. The solution uses computer vision technology and custom algorithms to provide highly accurate people counting analytics and can be integrated with most locations and technology stacks thanks to its one-size-fits-all flexibility. By adopting WaitTime's crowd analytics software, organizations can more efficiently allocate staffing, optimize security, communicate with visitors, and generally improve guest experience.

Once integrated, WaitTime can analyze massive crowds, enabling customers with the tools to manage, respond, and even monetize traffic and behavioral insights with deep precision and accuracy, while maintaining privacy through distributed security networks and anonymized data.

With an enormous opportunity across a number of facilities, including sports, entertainment, retail, convention centers, airports, and other large, dynamic public spaces, and a history of major brand success, WaitTime ranks high among the crowd analytics market's major players and technology partners.

Because of their niche expertise, WaitTime is currently working with some of the most renowned venues and sports teams in the world to help them master the art of crowd science by helping them by convert assumptions, to data and analytics.

Why? Because WaitTime provides a **highly scalable solution with accurate insights** that helps customers **make the best operations and business decisions possible**.

What Value Is to Be Gained by Using WaitTime?

The key to taking full advantage of WaitTime's benefits and abilities depends on the environment and its needs. Through WaitTime's nimble, scalable design, it can be configured to help clients accomplish a wide range of goals in industries such as: **Sports Facilities, Entertainment Venues, Airports, Retail Spaces, Convention Centers, Casinos, and more.**

Fueled by endless streams of real-time data, customers can interface with WaitTime's command and control application on mobile, tablet, or desktop devices. Here, users can accomplish an enormous range of tasks by utilizing interactive custom maps, a dynamic scheduling platform, queue busting protocols, mass communication, and other functions.



Create a welcoming and enjoyable space by interacting with guests through digital displays, mobile communications, advertising, line sizes and evenly distributed crowds.



Engage with historical data that improves services, business practices, and public spaces by self-learning and continually optimizing models.



Mitigate liability through a platform that helps operations managers develop efficient, proactive protocols such as capacity and egress, while collecting valuable video records.



Execute on intelligent and informed decisions by leveraging an aesthetic, intuitive operations dashboard designed to help personnel deliver better guest services, security, and analytics.



With the help of WaitTime, Intel, and Cisco, we can remove the guesswork about how and where shoppers are spending their time and make real changes to improve shopping experience."

– Aaron Nielsen,
Vice President, Information Technology at
Mall of American Dream

Crowd Insights at The Edge, Capabilities and Data Security: How WaitTime Works

First, the customer or integrators install the WaitTime API across mobile and browser-based systems to enable the sending and receiving of orders and other communications throughout the hardware and software network.

After footage is captured, the processed and privacy protected frames are sent from the edge devices to WaitTime's Management API for immediate analysis, then onto either a WaitTime hosted or private server for storage.

The data from the footage is analyzed using Real Time Streaming Protocol (RTSP) to identify or flag any factors that are impacting the environment and accurately assess how many people occupy a given space. From here, operators can access these insights by interfacing with WaitTime's operations dashboard. Should operators choose, the insights can then be shared with other personnel, or pushed to devices accessible to guests, allowing personnel to share important info via intelligent displays and mobile applications.

By using Intel® OneAPI, WaitTime was able to develop their software in an optimal manner, while streamlining their heterogeneous workloads to achieve a very high-level of performance. By running streamlined code and reclaiming processing power, WaitTime can focus on the important tasks like cutting slow lines and waits for guests, responding to critical events, while improving both guest experiences.

For example, WaitTime can provide venue operators and managers with access to information on crowd movement, line length, and line attrition, allowing them to proactively respond to the needs of guests and personnel where they are in real-time. This information results in increased venue efficiency, which in turn helps guests and workers enjoy a safe, positive environment.

The keys to these real time insights lie in WaitTime's five key analytical goals:



1. Ingress: Examine the frequency, location, and interest in a specific entrance or exit to determine real-estate premiums or refine real-time and historical documentation on crowd density.



2. Occupancy Tracking: Identify key business metrics like busiest times, average occupancy, and total foot traffic.



3. Queue Monitoring: Help guests make smart decisions by sharing crowd information with patrons through digital signs and applications.



4. Density: Monitor crowd densities in areas that have low ceilings, are exterior, or have existing cameras.



5. Anonymous Guest Experience Journey: Collect anonymous data by tracking behavior to align business strategies to actual information rather than assumptions.

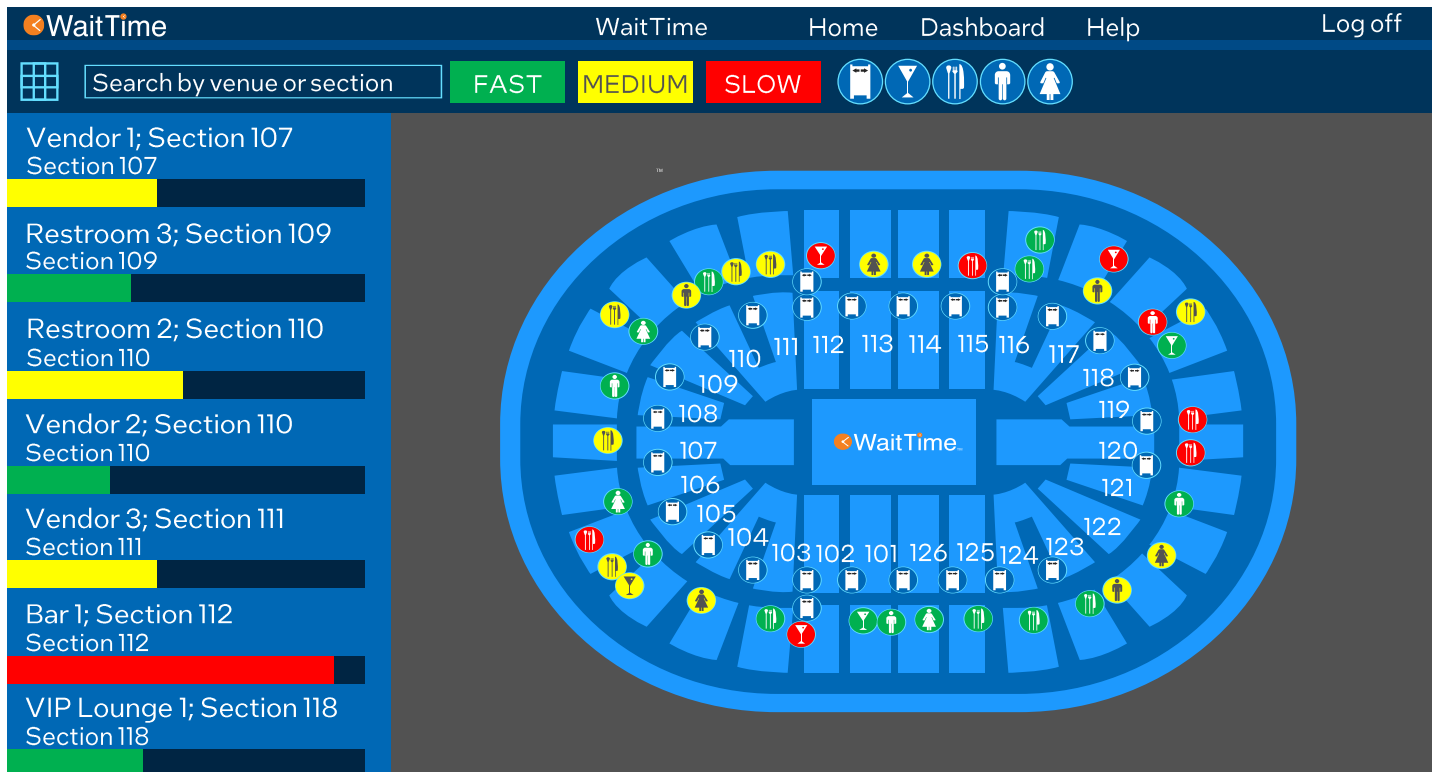
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“WaitTime leverages oneAPI and VTune™ to optimize our patented artificial intelligence. The granular documentation on code hotspots not only allows us to maximize code performance, but also allows us to optimize processing on Intel hardware.”

– Dr. Thomas Sterling, WaitTime AI Lead

Example User Interface



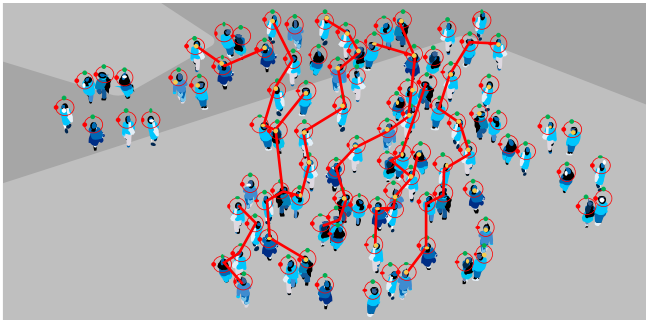
How Is WaitTime Unique Compared to The Competition?

The market is full of computer-vision solutions, so what makes WaitTime special? More so, why is it chosen over others by some of the world’s largest venues and stadiums as the leading environmental monitoring and crowd analytics platform? Where some solutions focus only on security and operations, WaitTime was built specifically with guests and crowds in mind. On the client’s end, the dashboarding, analytics, and command-and-control functions are delivered on a sleek, easy-to-use UI that is augmented by WaitTime’s optimization software and highly trained crowd management AI.

Conversely, WaitTime can streamline the porting batches of data to digital signage, mobile applications, websites, and other communications platforms that provide guests with information necessary to help them make the right decisions and have the most safe, positive experiences. As such, WaitTime stands above the competition because it meets the niche needs of event, entertainment, and large retail spaces that other companies may not even consider.

WaitTime sets itself apart from other similar solutions as it is one of the few solutions on the market designed to process high volume foot traffic, decreasing report times and making efforts to scale or reprioritize resources quicker and more efficient.

WaitTime's Most Distinct Competitive Advantage: The Four Key Custom Proprietary Algorithms and Their Respective Capabilities:



The Queuing Algorithm (Overhead):

Specialized to analyze behaviors and patterns of high and low volumes of organically forming cues, and runs a real-time API output measuring people in line relative the rate of service.

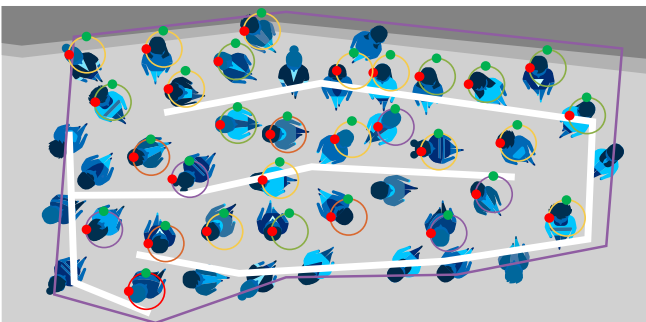
- Restroom lines
- Security lines
- Retail check-out lines
- Product areas
- Ingress gates



The Massing Algorithm (Z-Angle):

Developed as a real-time API to help analyze density and identify the real-time shape and behavior of an organic mass.

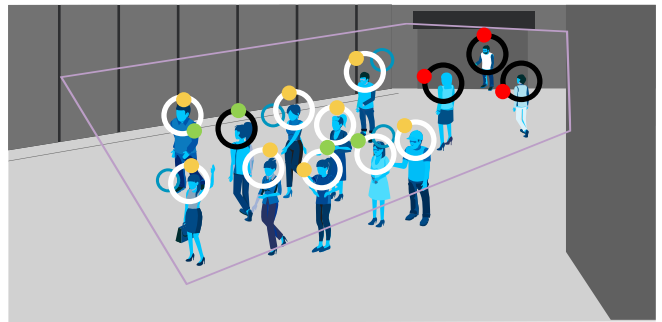
- Concession lines
- Event spaces
- Betting lines
- Cafeterias



The Stanchion Algorithm (Overhead):

Built to analyze artificial or more tightly organized lines, and runs the same real-time API as the Queuing Algorithm.

- Transportation terminals
- Area occupancy
- Events
- Funnel points



The Entry-Exit Algorithm (Overhead):

Built to automatically analyze real-time data focusing on the number of people who enter and exit a building, zone, or area.

- Clubs
- Exit ways
- Office buildings
- Seating capacities

Other Important Differences

Furthermore, unlike other competitors, WaitTime does not rely on Bluetooth or WiFi identification to track the flow of human traffic. Due to technology compliance updates, these features are slowly phasing out. However, WaitTime has never relied on these technologies, and is a generation ahead of the competition when it comes to researching and producing computer-vision based management solutions. When combined, these differences and features reveal a wealth of information relative operations, guest experiences, and revenues, that aren't even considered by other environmental monitoring systems manufacturers.

Case Study: Mall of America (MoA)

Mall of America is a national icon attracting over 40 million visitors each year and is dedicated to leading smart and innovative business practices through the use of technology, to improve guest experience and lead state-of-the-art operations intelligence.

In search of a platform that would help them collect better real-time insights, and make smarter business decisions, Mall of America turned to WaitTime. WaitTime's integration addressed the difficulties of capturing real-time granular foot-traffic data, insights, and risk analysis in crowded environments.

With WaitTime, granular data helps Mall of America anonymously and meticulously distinguish foot traffic, which allows them to make smarter data informed decisions, as well as build guest journey profiles to improve future experiences. Together, MoA and WaitTime defined four primary goals and outcomes:

- 1. Determine experience journeys** of guests within the mall
- 2. Provide real-time occupancy tracking** across all entrances and exits of the 2 million sq ft footprint
- 3. Improve business decision making and operations** through analysis of guest movement
- 4. Reduce assumptions** with granular, accurate people counting

Thanks to WaitTime and the Intel® Xeon™ processor, clients can power pre-integrated clusters to unify resources that can quickly provision, adapt, scale, and manage power your applications and business operations. Because of this custom enablement, Mall of America is now able to collect, manage, analyze, and transmit highly accurate and precise data on foot traffic entering and exiting the facility, and help businesses plan for real-time operations, security, and other protocols.

This has resulted in improved business intelligence through deeper analytics and a ROI-to-Traffic model that can help identify the most profitable times of day and week relative a vendor's location.

The Intel® Technology Story

WaitTime leverages Intel® Core™ processors for its servers, and Intel® Xeon® processors for hyperconverged edge compute to handle data intensive operations on a single platform. Because of Intel's powerful technology, one integration of WaitTime can service 40 cameras, and anonymously analyze thousands of individuals per hour. Furthermore, as WaitTime continues to optimize their solution on Intel® compute, their quality of services will continue to increase.

The Intel® oneAPI Analytics Toolkit improves the performance of the solution. By leveraging Intel® oneAPI, WaitTime runs with better version control, increased performance, and performance analytics to continuously improve its own code by identifying and fixing "hotspots," regions of a computer program that require the most time to execute, for further improvement.

Lastly, WaitTime uses Intel® VTune™ to identify those hotspots when refining code. This tool helps sequester segments that are causing performance bottlenecks, which can then be mitigated or eliminated to improve performance. Overall, the use of Intel® technology has allowed WaitTime to improve their solution by enabling them with the power to process large quantities of data, faster and more efficiently, all while identifying areas for further growth.

Components of The MoA WaitTime Solution

WaitTime

- Entry-Exit Algorithm
- Operations Dashboard
- End of Day Reports
- Real-time (API)
- Historical (csv) data

Intel

- Intel® Xeon™ Scalable processors

Cisco

- Cisco UCS Servers
- Cisco Meraki Smart Cameras

Data Collection and Protection

To accomplish the goal of protecting user data, WaitTime has engineered their platform to meet the highest level of testing and scrutiny, ensuring both customers and guests know the software is handling their data responsibly.

WaitTime is certified for deployment in numerous markets. For additional information, please speak with a WaitTime representative to discuss how WaitTime can meet compliance needs.

Summary

In conclusion, WaitTime provides highly advanced crowd intelligence, analytics, communications, and management capabilities. The robust, custom algorithms are designed for accuracy and precision all within a one-size fits all package. Equipped with an operations platform and smart-guest way-finding platform, WaitTime turns crowd data into real-time insights that can help monetize traffic, improve guest experiences, and optimize operations by converting dynamic metrics into precise analytics.

Learn More about Intel and WaitTime

Intel® Products and Technologies

- [Intel® Xeon® Processors Product Page](#)
- [Intel® Core™ Processors Product Page](#)
- [Intel® oneAPI Product Page: A New Era of Heterogeneous Computing](#)
- [Intel® VTune™ Profiler Product Page](#)

WaitTime Products and Technologies

- [WaitTime Homepage](#)
- [WaitTime Virtual Demo](#)
- [WaitTime Crowd Intelligence Products and Services Page](#)
- [Wait Time at Mall of America Case Study](#)



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