Product Overview

The Occupancy Analytics Platform for Connected Buildings

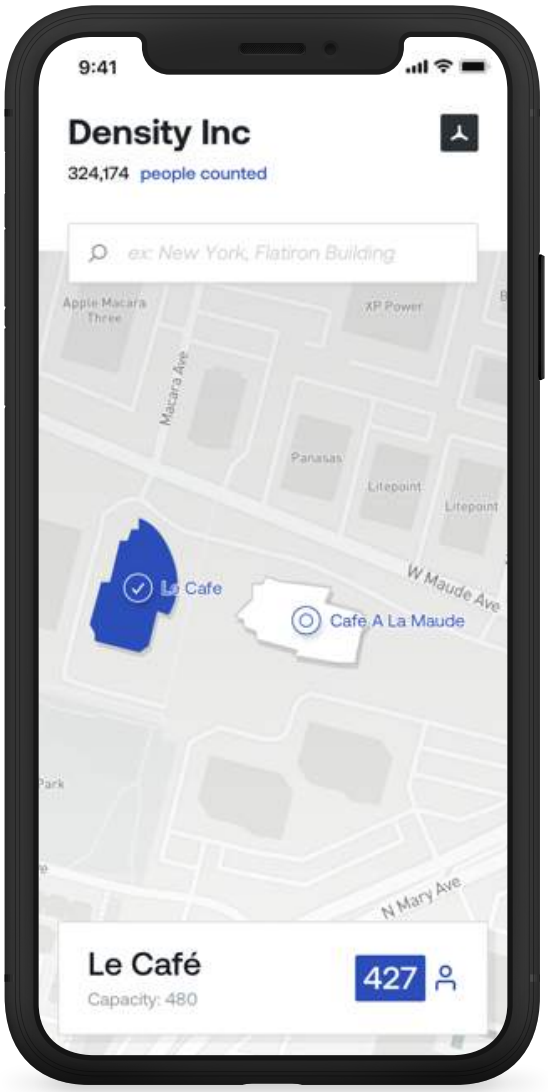
Density

Introduction

Commercial real estate—variously referred to here as “the built environment”—is arguably the largest asset class we know the least about.

At over $6 trillion, it represents nearly 10% of global GDP. And yet, answers are elusive to even the simplest of questions. How many people used this room today? On a peak day, how many visitors do I get? Does my building have enough or too much square footage for the next five years?

Answers to these seemingly mundane questions are, in fact, the keys to unlocking vast amounts of potential in your business’s two most valuable assets: people and real estate.



About Density

Density was founded in 2014 to give business decision-makers the data they need to understand how people—employees, visitors, tenants, customers—interact with the built environment. Our vision: a world in which smart buildings anticipate occupant needs, from suggesting ideal floor plan layouts to predicting optimal levels of on-demand services and amenities.

To realize this future, Density built the industry's most accurate, fully anonymous people-counting technology. Using proprietary sensors, proprietary software and machine-learning algorithms, Density's platform anonymously tracks how people make use of physical spaces.

Businesses use Density to:

- [x] Identify and eliminate millions of dollars of waste in unused real estate
- [x] Notify occupants when spaces are available in real time
- [x] Track and predict foot traffic
- [x] Optimize the workplace experience for employee engagement
- [x] Plan intelligently for growth
- [x] Strengthen physical security and emergency response

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How it Works

The Density Depth Processing Unit (DPU)

Density's platform is made possible by its DPU, a plug-and-play Internet of Things (IoT) enterprise device. Installed above a doorway, the DPU uses powerful sensors to capture depth data. On-device artificial intelligence (A.I.) and machine learning algorithms process this data to accurately and anonymously measure human movement and activity. The DPU intelligently upgrades itself via automatic firmware updates, and continually learns from its environment to increase accuracy over time.

WIRED

"Since it's tracking movement, it doesn't know who's coming through those doors, alleviating privacy concerns."

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All-New Technology

Unlike cameras—which are less accurate because they rely on pixel-based methods for detecting motion and scene changes—Density's technology uses depth data. The Density DPU uses infrared lasers to actively scan the area underneath the door where it's installed, capturing hundreds of thousands of depth readings every second. Machine learning algorithms process this data in real-time, precisely measuring human movement and ignoring non-human activity. The algorithms' output—an accurate count of entrances and exits—is securely sent to Density's cloud service and also made available via RESTful APIs. All Density devices work securely with standard Power over Ethernet Plus (PoE+) network infrastructure.

DPU

Each DPU has an on-board processor. Machine learning algorithms continuously process anonymous depth data to identify human movement.

Density Cloud

Count data—+1 for an entrance, -1 for an exit—are sent to Density's secure cloud service. Data is fully encrypted at all times, in transit and at rest.

Density Software

Users are able to access real-time and predictive data—as well as rich analytics and report—in the Density Dashboard, mobile applications, and via API.

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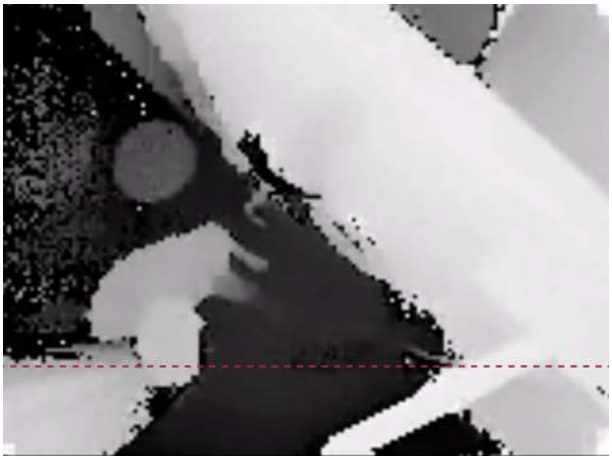
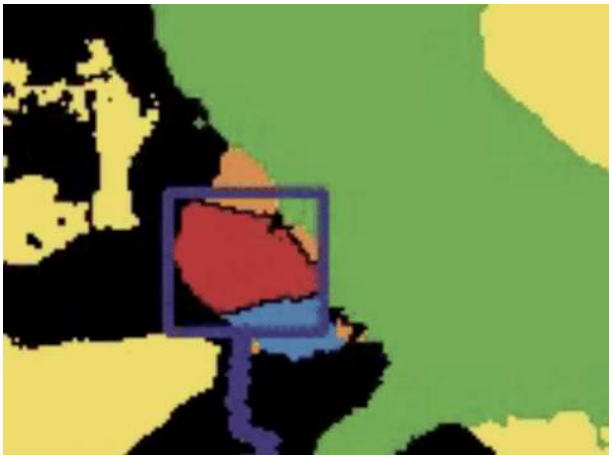
A.I.-Driven Devices that Learn

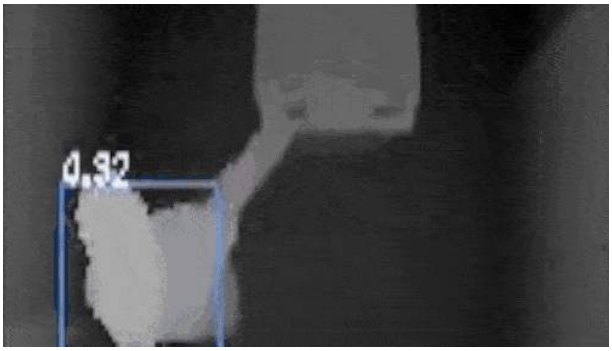
The Density DPU achieves unparalleled accuracy by learning from its environment over time. As its machine-learning algorithms process information, Density updates its depth models. Density is also the only provider that validates its platform's accuracy. As part of an initial device calibration period—and periodically thereafter—the DPU conducts an accuracy audit process. During an audit, the device sends a raw data sample to Density's cloud environment, where it's processed and graded for accuracy. The results are fed back into the device's algorithms and are shared the results with customers upon request. Outcome: Density is able to offer the industry's most accurate system for anonymously counting and tracking people.





Private & Anonymous

Density believes that ensuring occupants' privacy is critical to capturing accurate and comprehensive data in all space types. Accordingly, Density's platform is built from the ground up with a "privacy first" approach to technology design. At no point does the Density device collect personally identifiable information (PII) from the environment where it's installed. So even in the unlikely case that the raw data captures are accessed, it's not possible to identify gender, ethnicity or other identity-based characteristics. As a result, Density can be deployed to measure utilization in conference rooms, work stations, lobbies—even restrooms—without infringing on occupant privacy. The technology also complies with General Data Protection Regulation (GDPR) guidelines.



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Enterprise Security

Density's technology is built with the industry-standard best practices for data protection and security. Every element of Density's service—the DPU, APIs, cloud-hosted infrastructure and software—is designed to ensure that data is captured, processed and transmitted in a secure manner. Regular over-the-air (OTA) firmware updates are included as part of Density's service, ensuring that every device has the latest capabilities and security enhancements. The platform automatically logs metrics on system health, performance metrics, hardware diagnosis, and user-access logs. Our platform is designed and maintained by experienced teams with a proven track record building secure technology systems for enterprise customers.

- HTTPS/TLS 1.2 encryption (data in transit)
- AES 256-bit encryption (data at rest)
- Automatic firmware and security upgrades

Easy to Manage at Scale

Designed for enterprise deployments, the Density DPU integrates with standard corporate IT networking equipment. The device is most commonly deployed on any Power over Ethernet Plus (PoE+) capable switch, though when paired with a PoE+ injector it can also be deployed over Wifi and 4G networks.

Network configuration with Density is straightforward. The device makes only outbound connections via Port 443, and data is encrypted at all times: HTTPS/TLS 1.2 is used for data in transit, and AES 256-bit encryption standards are used for data at rest. (See our Security Doc for more details.) In a steady state, the device uses approximately 35 kpbs, for an average of about 50 MB per 24 hour period.

Finally, Density can deployed where cameras often are unwelcome—either for aesthetic reasons or because of concerns around occupant privacy. The device's industrial design and small form factor make for unobtrusive installations. And because the device never captures PII, people are unaffected by Density's presence—be they employees, tenants, visitors or customers.

- Secure outbound connections via Port 443
- Plug-and-play provisioning
- Standard PoE+ networking equipment

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Smart Building Integrations

Use Density's API for easy integrations into any workplace application.

"Customers can count how many people enter and exit a physical space and integrate it into their pre-existing software solutions."

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Why Density?

Why Density?

Unlike Density, alternative approaches to measuring how people use space are invasive, inaccurate or unscalable. Security cameras and Wifi-enabled MAC address tracking are invasive because they capture personally identifiable information (PII). They also fail to achieve adequate accuracy thresholds for particular use cases, such as room-level occupancy analytics. Break beam sensors are inaccurate; they're easily fooled by two people walking side by side, for instance. And doing manual counts using staff is expensive and unscalable.

Density builds the world's first non-invasive, highly accurate and highly scalable technology for counting people. The platform is purpose-built for anonymously measuring how people move throughout buildings, enabling function-specific software and applications

Designed For:

- [x] Workplace teams
- [x] Corporate real estate teams
- [x] Physical security teams
- [x] Facilities teams
- [x] Retailers
- [x] Other decision makers responsible for building performance

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Technology Landscape

Alternatives	Why Alternative Doesn't work	Density
"Bed checks"	☒ Paying people to monitor space use is expensive	☑ Cost-effective; non-imposing design
Break-beam sensor	☒ High false positive rate — can't measure multiple entrances and exits	☑ Not fooled by groups and multiple entrances
Camera with facial recognition	☒ Invasive; less accurate than depth data	☑ Highly accurate and anonymous
Desk/seat sensor	☒ Not accurate for utilization of room, floors, buildings	☑ Scalable for every room, floor, and building

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Use Cases

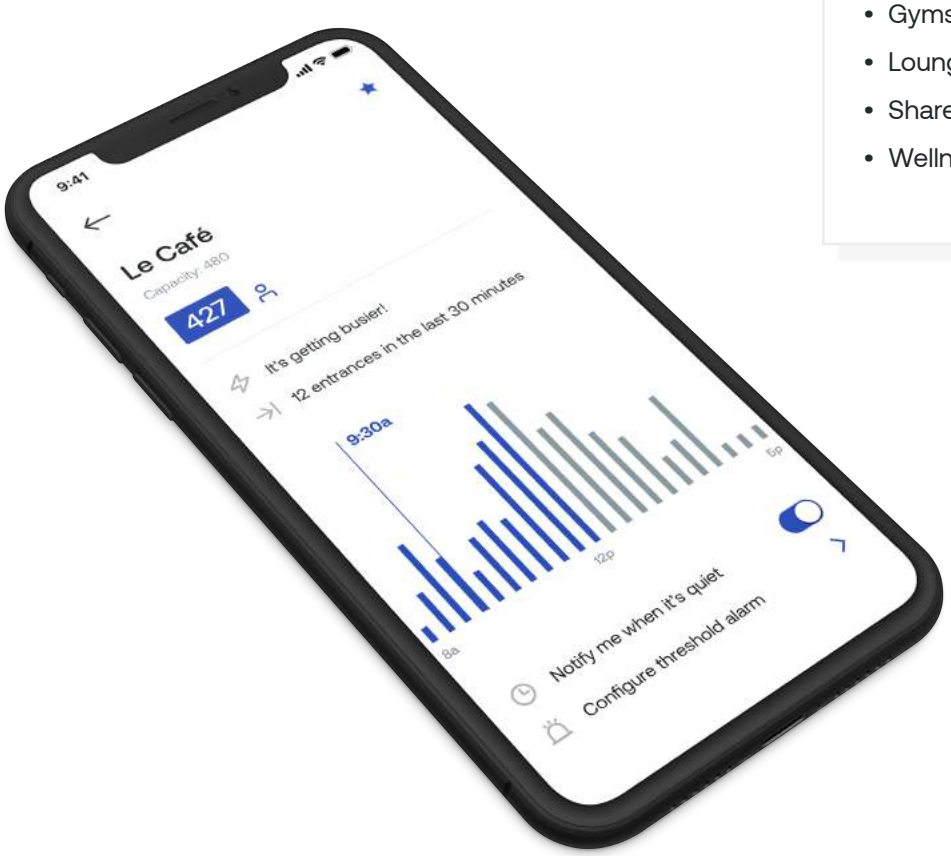
Live Experiences

Share ‘Busyness’ in Real Time

With Density’s mobile application, it’s easy to let people see how busy their favorite locations are in real time. From office cafeterias and open areas to hospitality lounges, teams deploy Density to enable exceptional experiences. Users are able to check the real-time occupancy count—also referred to as a location’s “busyness.” If the location is too busy, the user can easily customize their settings to receive a notification when things quiet down. Result: enjoyable experiences that save time and money.

Let employees see real-time busyness of their favorite places:

- Cafeterias & cafés
- Kitchens
- Gyms
- Lounges & game rooms
- Shared workspaces
- Wellness rooms



Space Planning & Utilization

Improve Space Utilization

Workplace and real estate teams use Density to gain portfolio-wide visibility into how square footage performs based on utilization benchmarks. Customers access utilization data across their corporate real estate initiatives--from employee productivity and amenities, to growth and consolidation programming. Density's proprietary people-counting technology makes it possible to count every entrance and exit at scale—in every room, building, and floor. Teams can access a central dashboard with utilization metrics or integrate the data into their Integrated Workplace Management System (IWMS) and workplace applications.

Knoll

"Our clients often struggle with how to make the best decisions and Density now helps provide clarity and transparency."

Kylie Roth, Senior Director, Workplace Research at Knoll

Reduce Costs

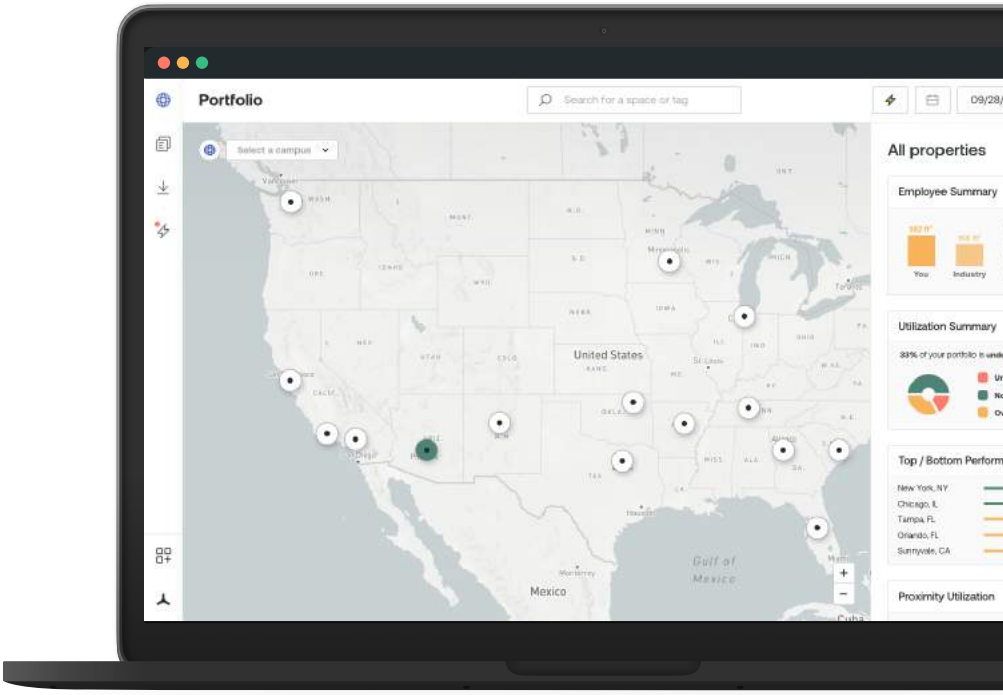
Quantify underutilized space to consolidate square footage or avoid waste in future programming.

Simplify Space Planning

Gain a central, intuitive UI to manage your portfolio and maximize for utilization.

Validate Needs

Obtain accurate data on how each room, floor, and building is used.



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Workplace Experience

Optimize Workplace Experience

Density helps enterprises maximize workplace performance for their people and the space they use. Use Density's analytics to collect comprehensive utilization data and understand how employees interact with the work environment. Workplace teams ensure that janitorial, culinary, workplace, and facility teams optimize amenities and services based on actual usage.

Avoid Service Shortfalls

Adjust your workplace amenities to actual usage, and improve services from catering to cleaning.

Increase Productivity

Gain a central, intuitive UI to manage your portfolio and maximize for utilization.

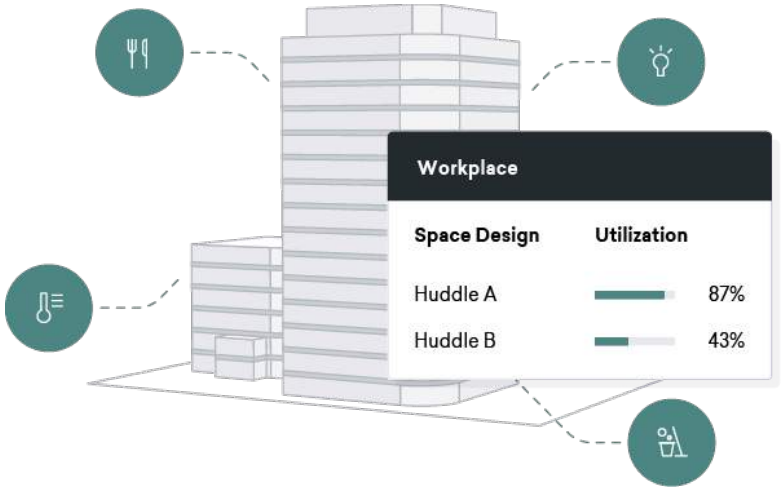
Validate Design

Test space designs to match the workplace experience to employee needs.

workfrom

"Our users have been asking, 'Is it busy?' since we started the company. Density can help us provide insight." and "After adding Density, we saw as much as a 950% increase [in use] to supported locations. Our users love it."

Darren Buckner, Workfrom CEO Darren Buckner, CEO workfrom



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Physical Security

Strengthen Physical Security

Physical security teams use Density as a cost-effective, scalable solution to mitigate unauthorized building access due to tailgating. Made possible by Density's proprietary people-counting technology, the solution is easy to install and can be integrated with most major access control providers.

Dropbox

"Everybody knows that tailgating is a problem... it's just too hard of a problem to solve. And now with Density, it's been solved."

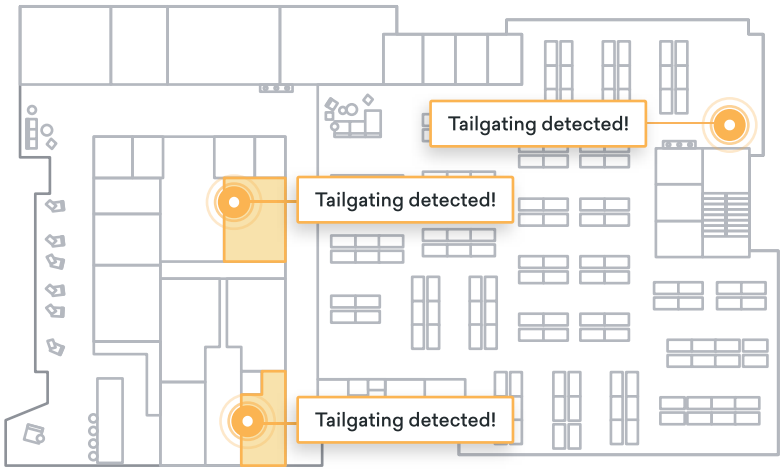
Chris Bauer, Physical Security Systems Architect at Dropbox

Eliminate Security Threat

Prevent unauthorized persons from accessing your facility.

See Real-Time Occupancy

Deploy Density building-wide to know the real-time occupancy of every room.



Strengthen Physical Security

Eliminate known security loopholes in your physical security system.

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Density is the new occupancy analytics platform for connected spaces. Using proprietary sensors and software, the platform accurately measures foot traffic throughout buildings. Enterprise teams use Density to eliminate underutilized real estate, deliver exceptional workplace experiences, and strengthen physical security. Unlike alternatives—which are either invasive or imprecise—Density is both anonymous by design and the industry's most accurate system.

Together, Density's customers manage over 100 million square feet of corporate real estate. Density was founded in 2014, with offices in San Francisco, New York City, and Syracuse, New York.

Want to Learn More?

Get a Demo at density.io