



# Delivering the Smart Campus through Insights and Experiences

QUESTnet 2018

Mark Krischer

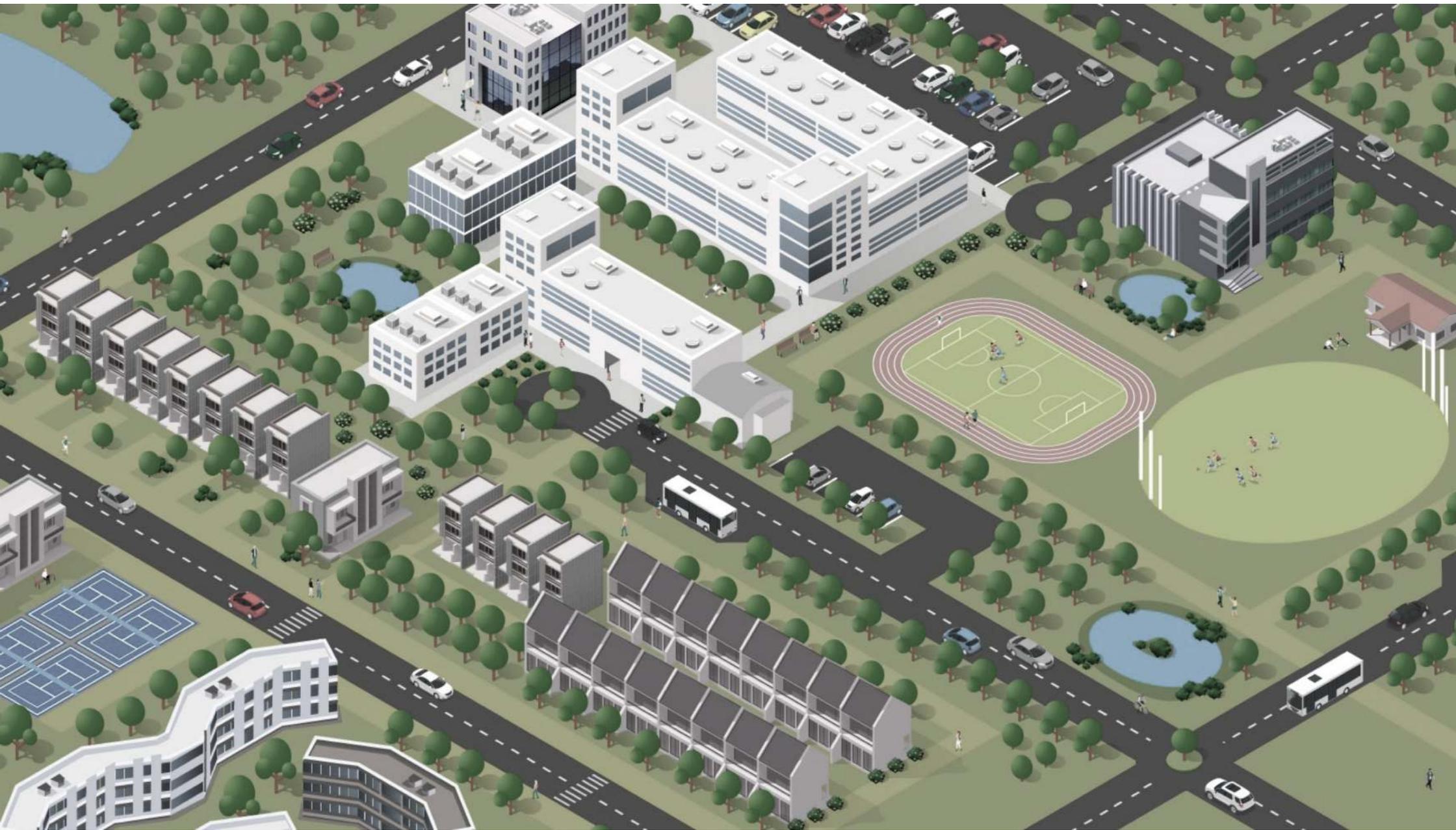
Wireless Evangelist, Cisco - Asia Pacific

27 September 2018



QUESTnet

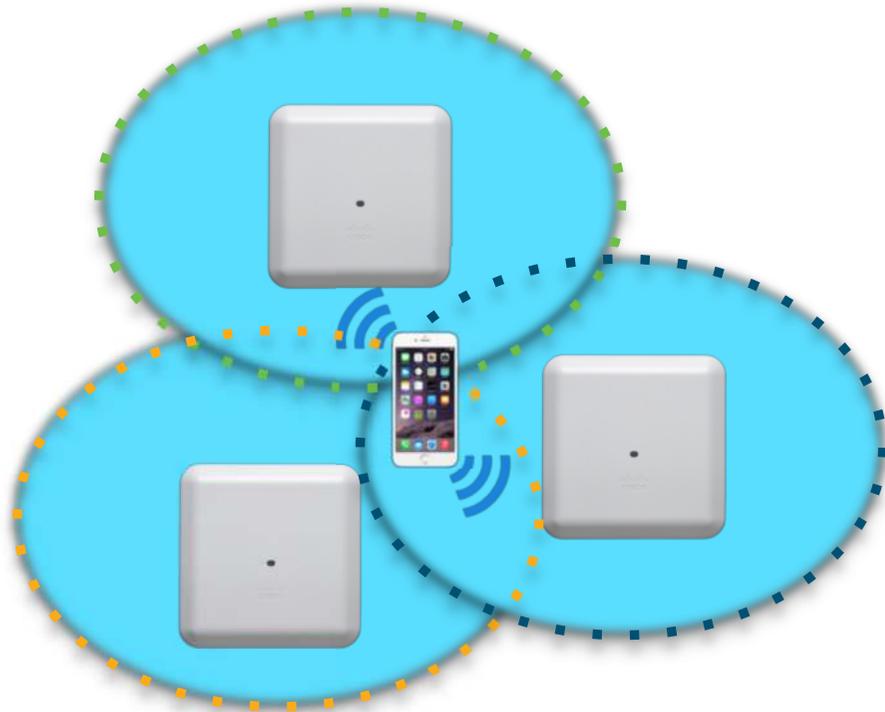
Delivering the  
Smart Campus  
through  
Insights and  
Experiences



Understanding  
Location

# Understanding Wi-Fi Location

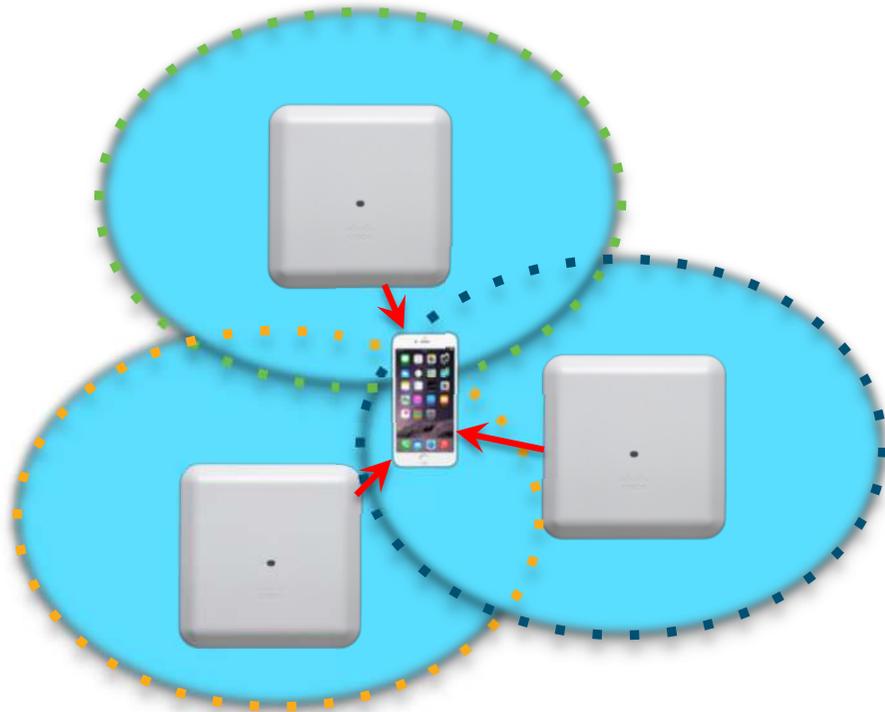
## Trilateration



- Distance is calculated relative to received signal strength
- Signal strength can be impacted for many different reasons
- Accuracy will be highest when a device is seen by 4 or 5 APs

# Understanding Wi-Fi Location

## Hyperlocation and Fast Locate



- Hyperlocation adds Angle of Arrival to calculations, improving accuracy
- Fast Locate provides up to 8 data points a minute, improving granularity

Lies,  
Damned Lies  
and Analytics

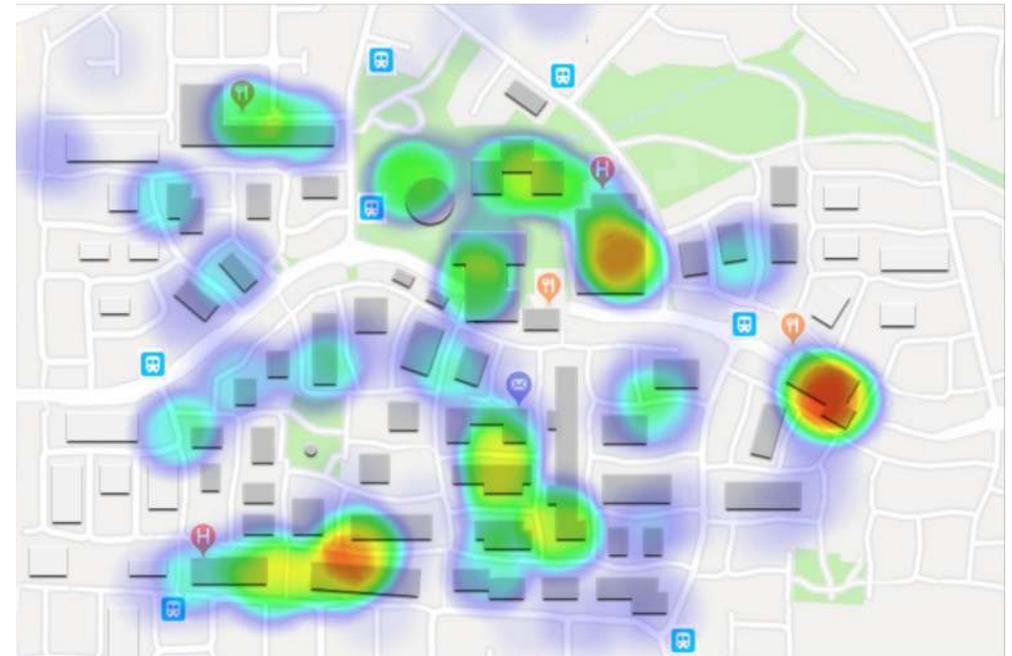
# A 35m Deep Problem

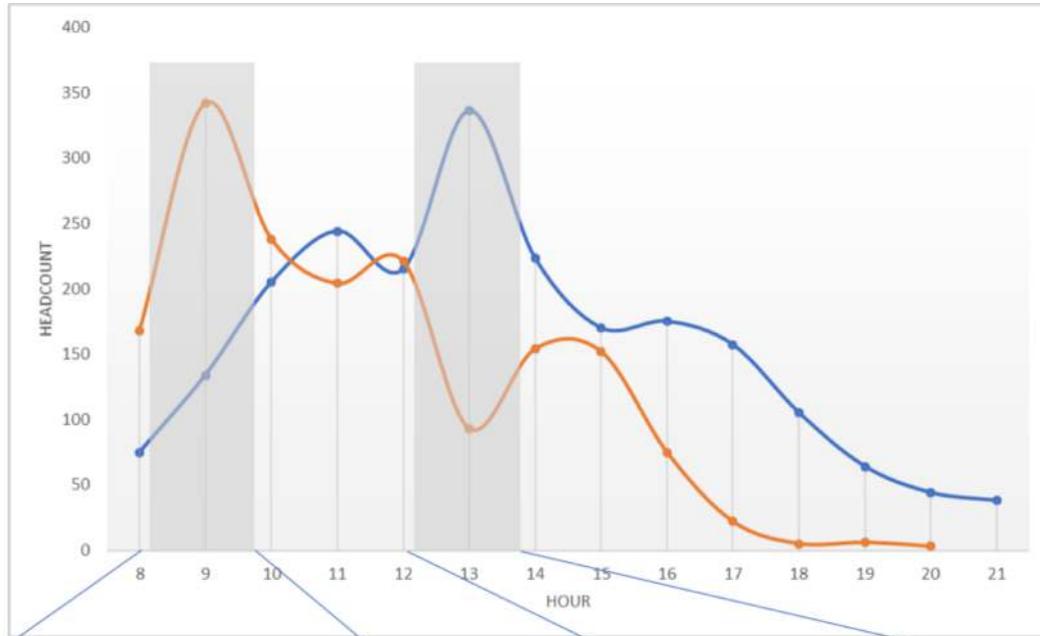
- Melbourne Metro Rail  
5 year impact
  - Campus Crossing
  - Space Usage
  - Student Timetables
  - Traffic
- All while going through a strong growth period



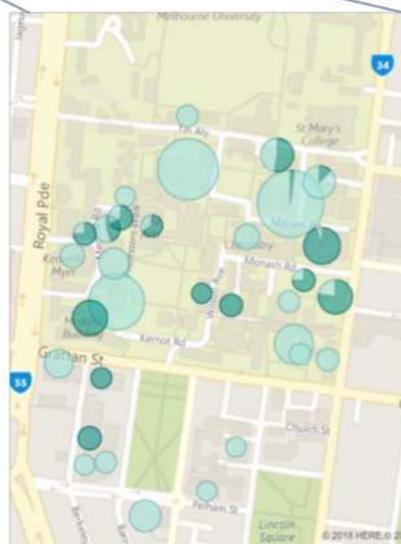
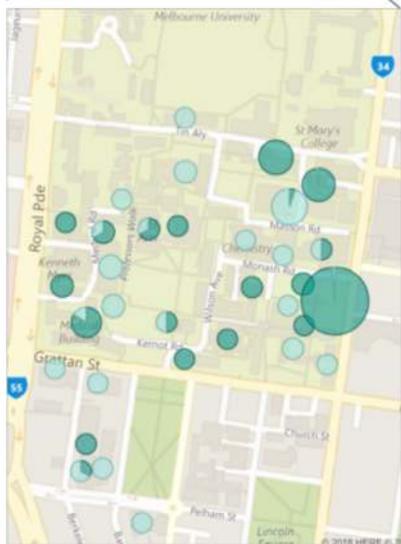


# Static and Dynamic Data



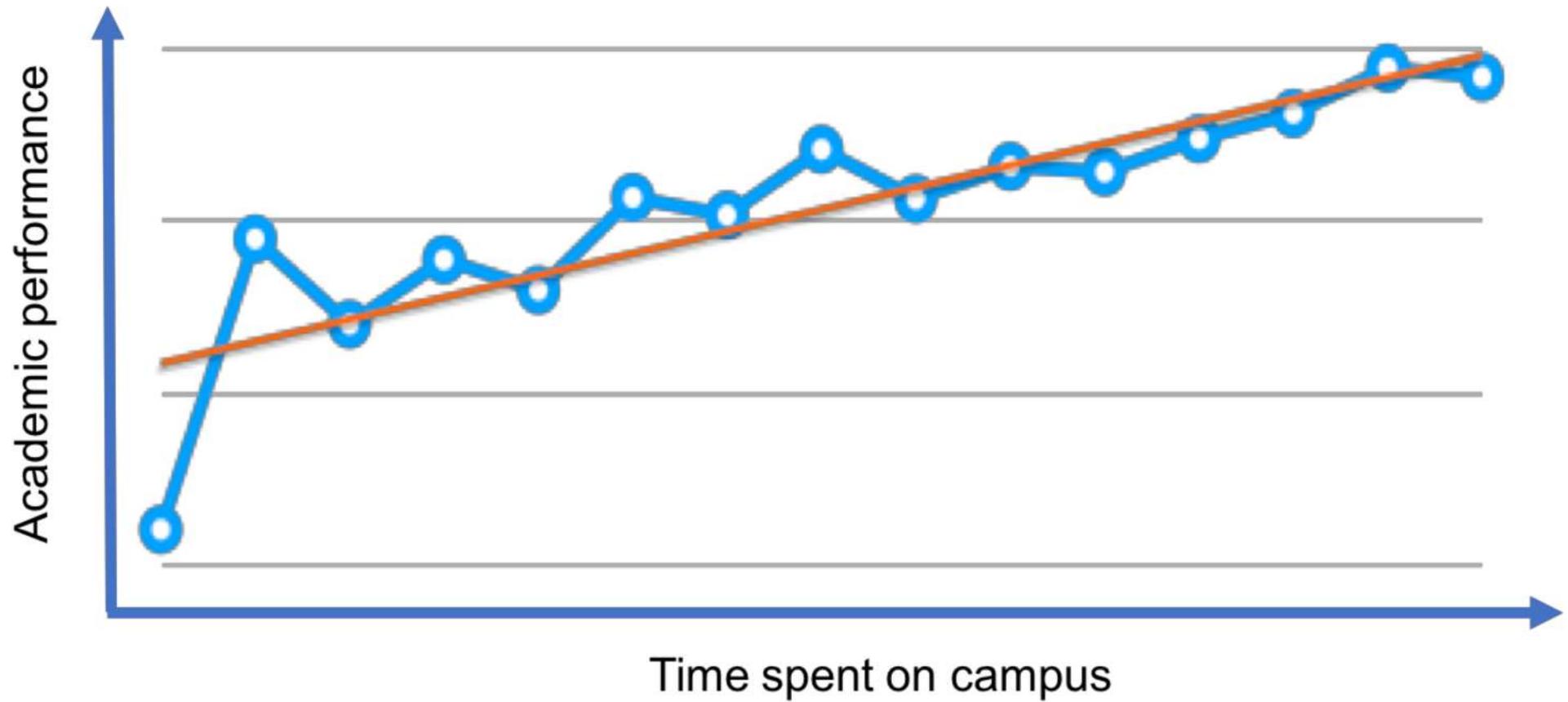


— During class  
— Outside class hours



● During class  
● Outside class hours

# Correlations



# Data Sources



Name	Count	Frequency	Occupancy	Utilisation
<b>5051</b> 5e Verdieping	28	100%	34%	117%
		100%	43%	108%
		100%	30%	100%
		100%	25%	97%
		100%	39%	94%
		100%	37%	92%
		100%	53%	92%
		100%	21%	88%
		100%	27%	86%
		100%	20%	85%
		100%	38%	85%
		100%	28%	82%
		100%	30%	81%

Name	Empty hours	Empty seats	No-shows
<b>INF65000_1AF</b> Tue, Wed. 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717. Forum	38/43	504/517	7/10
<b>FTE12303_1AF</b> JanWillem.Hofstee. Thu, Tue, Wed, Fri. 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 3040, 4030. Forum, Orion	39/51	365/378	7/14
<b>YEI10306_1MO</b> Hans.Helder. Mon, Fri, Wed, Tue. 0213, 0218, 0221, 0318, 0321, 0326, 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 1005, 1...	48/78	328/345	7/25
<b>YEI10306_1AF</b> Hans.Helder. Mon, Tue, Thu, Fri, Wed. 0213, 0218, 0221, 0318, 0321, 0326, 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 10...	50/89	287/309	8/30
<b>YNH10302_1AF</b> Rolf.Martijn. Wed, Mon, Fri, Tue. 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 0725, 0767, 1032, 2030, 3031, 3032, 4044, 4...	40/74	238/256	8/27
<b>HNE24806_1AF</b> Marianne.Geleijnse. Mon, Wed, Fri, Thu. 0432, 0504, 0508, 0512, 0516, 0531, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 0725, 1005, 2005, 2006, ...	26/54	230/259	5/22
<b>FPH10306_1AF</b> Erik.vanderLinden. Mon, Tue, Thu, Fri, Wed. 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 1005, 1032, 1040, 2005, 2006, 20...	48/109	202/240	8/38
<b>MCB20806_1MO</b> arnout.fischer. Mon, Tue, Thu, Fri. 1032, 1040, 2030, 2035, 2050, 2051. Orion	2/36	192/271	0/20
<b>HAP20306_1MO</b> jessica.hegeman. Thu, Fri, Mon, Tue, Wed. 0222, 0321, 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0635, 0707, 0713, 0717, 0725, 0732, 0803, 0832, 083...	39/85	147/165	8/25

194 classes, 3257 lessons, 332 no-shows (10%).

Q

Name

Empty hours

Empty seats

No-shows

**INF65000\_1AF**

Tue, Wed. 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717. Forum



**FTE12303\_1AF**

JanWillem.Hofstee. Thu, Tue, Wed, Fri. 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 3040, 4030. Forum, Orion



**YEI10306\_1MO**

Hans.Helder. Mon, Fri, Wed, Tue. 0213, 0218, 0221, 0318, 0321, 0326, 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 1005, 1...



**YEI10306\_1AF**

Hans.Helder. Mon, Tue, Thu, Fri, Wed. 0213, 0218, 0221, 0318, 0321, 0326, 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 10...



**YNH10302\_1AF**

Rolf.Martijn. Wed, Mon, Fri, Tue. 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 0725, 0767, 1032, 2030, 3031, 3032, 4044, 4...



**HNE24806\_1AF**

Marianne.Geleijnse. Mon, Wed, Fri, Thu. 0432, 0504, 0508, 0512, 0516, 0531, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 0725, 1005, 2005, 2006, ...



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Erik.vanderLinden. Mon, Tue, Thu, Fri, Wed. 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0621, 0625, 0707, 0713, 0717, 1005, 1032, 1040, 2005, 2006, 20...



**MCB20806\_1MO**

arnout.fischer. Mon, Tue, Thu, Fri. 1032, 1040, 2030, 2035, 2050, 2051. Orion



**HAP20306\_1MO**

jessica.hegeman. Thu, Fri, Mon, Tue, Wed. 0222, 0321, 0504, 0508, 0512, 0516, 0602, 0606, 0612, 0616, 0635, 0707, 0713, 0717, 0725, 0732, 0803, 0832, 083...



Reports

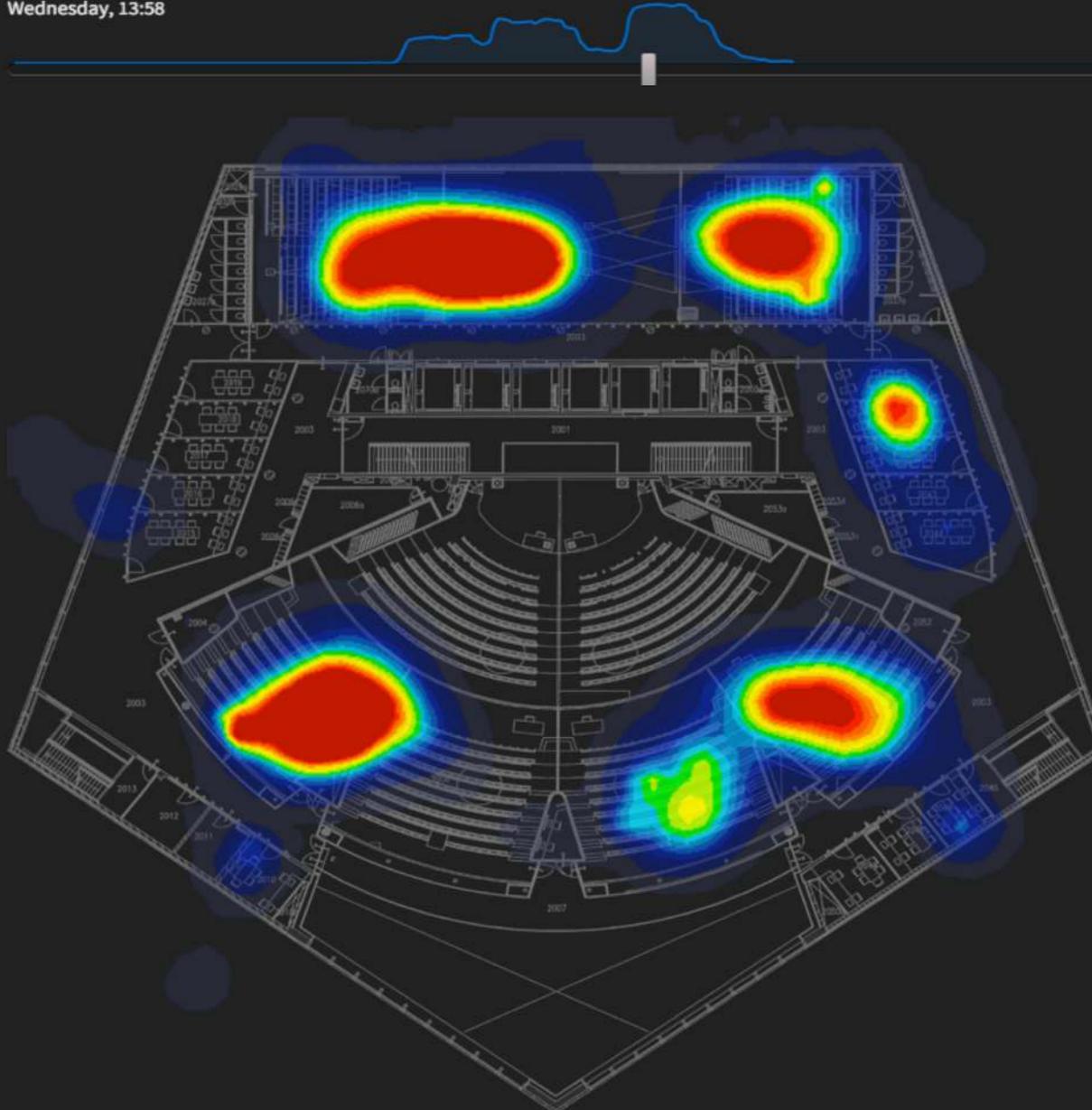
Heatmap

Schedule

< January >  
2016

Mo	Tu	We	Th	Fr	Sa	Su
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

Wednesday, 13:58



- Orion
- 8E VERDIEPING
  - 7E VERDIEPING
  - 6E VERDIEPING
  - 5E VERDIEPING
  - 4E VERDIEPING
  - 3E VERDIEPING
  - 2E VERDIEPING
  - 1E VERDIEPING
  - BEGANE GROND

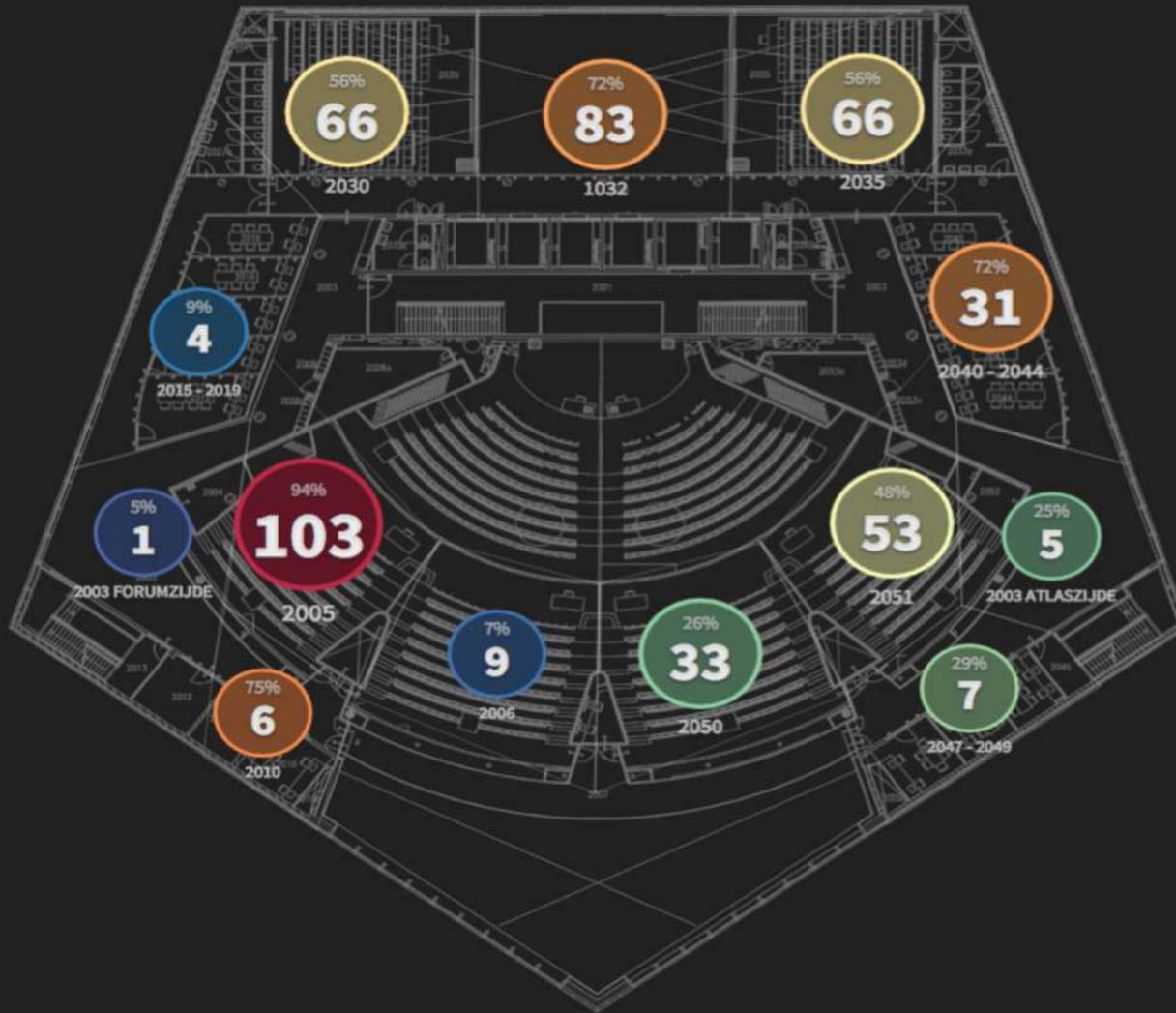
Building

Now	1061
Average	426
Peak	1196
Utilisation	27%

Floor

Now	467
Average	120
Peak	472
Utilisation	48%

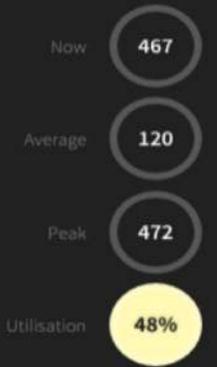
Show layer:  Heatmap  Zones



Building



Floor



# Where can I find space?

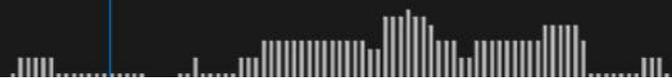
Want to know where you can easily find an available work area? Do you need to know, for example, how long you need to queue for in the restaurant? Look here to find out where the quietest areas are.

TU 10 JANUARY  
10:38:00



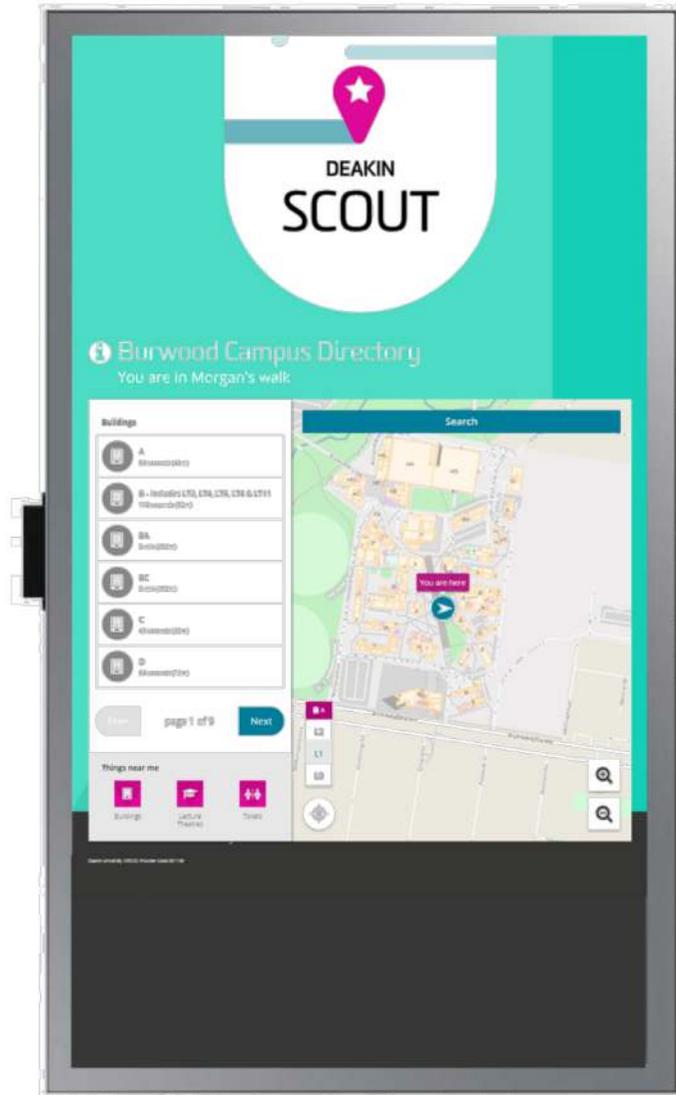
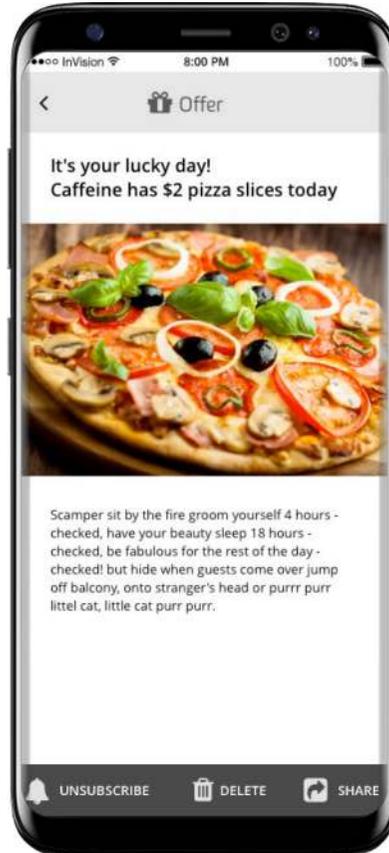
Today  
Expected

FLOOR 5  
0556



Engaging  
Students

# Digital Experiences



# Wayfinding



The screenshot displays the MazeMap wayfinding interface. At the top, there is a search bar with the text "Q Search" and navigation icons. On the left, a "Locations" menu is visible, along with zoom and location controls. The main map area shows a blue route connecting two points, A and B, across the UON - Newcastle (Callaghan) campus. Point A is located at the Health & Physical Education (HPE) building, and Point B is at the Information and Communication Technology (ICT) building. A pop-up window in the bottom center provides route details: a distance of 1.5 km and a time of 31 minutes. Below this, it lists the start and end points with their respective building names and floor numbers. The map also shows various campus buildings and streets, such as Truscott St, Lovell Parade, and the Newcastle Inner City Bypass.

**Locations**

Q Search

**1.5 km** **31 min**

**A Point**  
Sports & Aquatic Centre (SCH), Floor 3

**B Point**  
Information and Communication Technology (ICT), Floor 3

**UON - NEWCASTLE (CALLAGHAN)**

Health & Physical Education (HPE)

Information and Communication Technology (ICT)

Wetlands Pavilion (WP)

Tunra Annexe (TA)

Engineering Electrical (EE)

Engineering Classrooms (EF)

Chancellery (CH)

University Union Hunter (UH)

Student Services (SC)

Hunter (H)

Richardson Wing (RW)

The Station 3

Bowman Building (BB)

Residence North (SAB)

Residence East (SAC)

Residence South (SAD)

Evatt House Accommodation Hub (EVAD)

Evatt House Block G (EVG)

Residential Cottage (RC)

Edwards Hall Block B (EHB)

Edwards Hall Block F (EHF)

Ray Watt Pavilion (RWOP)

NIER Block A (NIERA)

NIER Block C (NIERC)

Architecture Built Environment Workshop (ABEW)

Psychology (AV)

Language Centre (LC)

Biological Sciences (B)

Chemistry (C)

Physics (P)

Earth Sciences Core Shed (ESCS)

Social Science (SR)

Behavioural Science (W)

Drama Studio (DS)

University Union Shortland (US)

Industry Development Centre (IDC)

mapbox

MazeMap | Terms

# Wayfinding



Home Maps > Directions

## Directions

**From:**  
G22 : Union House (130), G

**To:**  
208 : 11 Barry St (266), 2

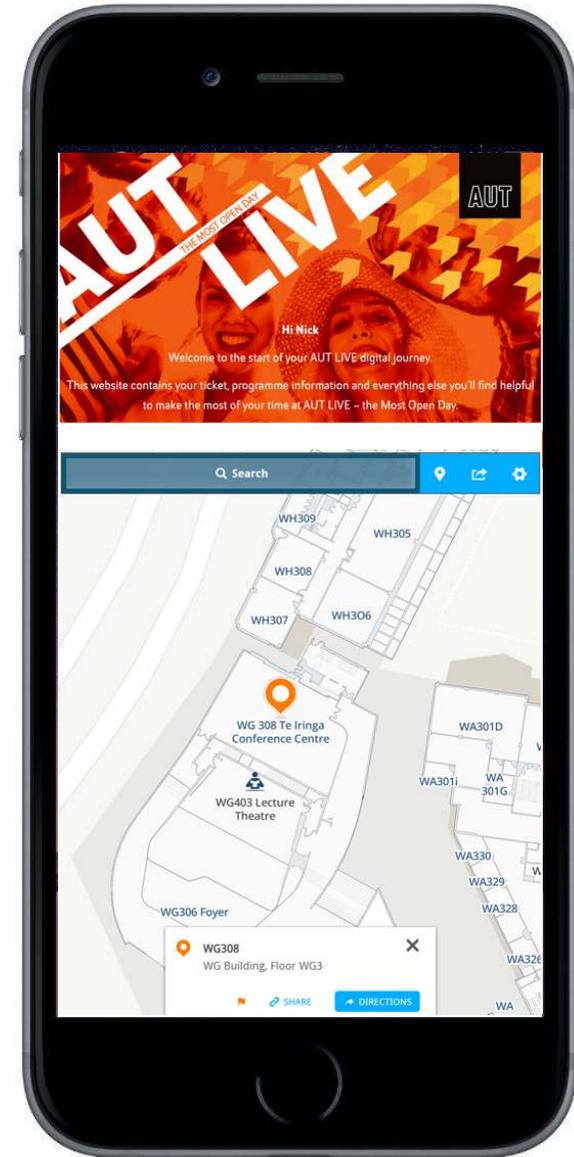
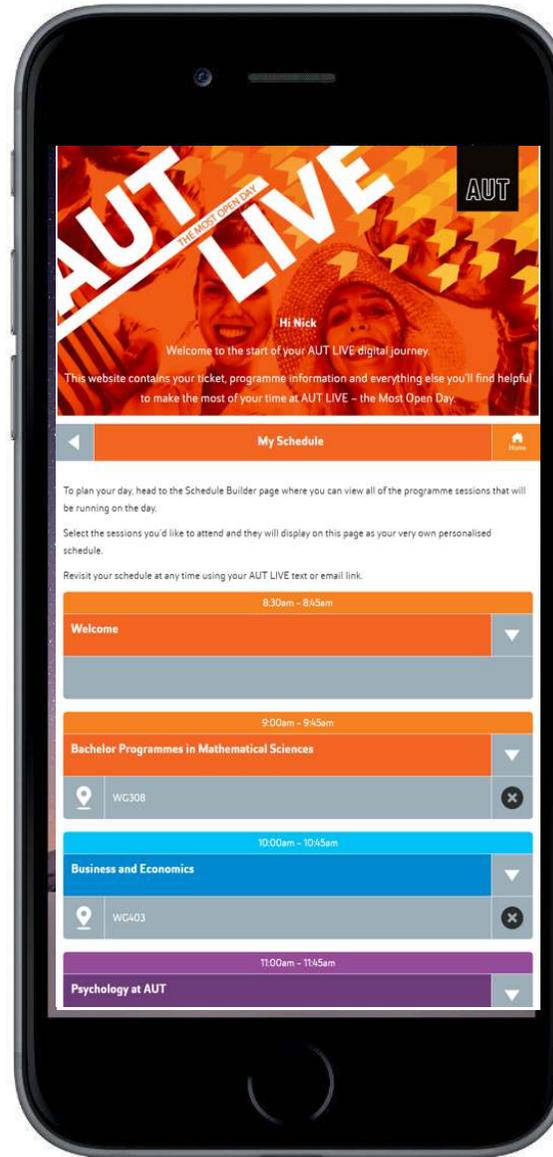
Click the map to set new start or end points.  
[Reverse directions](#), [Avoid obstacles](#).



# Application Integration

The screenshot displays the Scintia application interface. On the left is a dark sidebar with the Scintia logo, user information (USER: Scintia Demo, LOGOUT), and navigation options (Find timetable, My timetable, Profile, Help, Contact us, Europe/London (+00:00), English). The main content area is titled 'MY TIMETABLE' and shows a weekly view for Tuesday, 20 Mar, from 8:00 to 18:00. A class entry for 'AC101(FT)/SEM/4 <2-12, 25-29> (CTR 16)' is highlighted, with details: Description, Module (Accountancy), Staff (Archer, A.), Weeks (2-12, 25-29), Location (CTR 16), Zone (Lakeland Bus), and Map (<http://bit.ly/2x...>). A Wi-Fi icon is visible below the class details. An overlay map window shows a floor plan with a location marker for 'B1-040' on 'B1, Floor 1'. The map includes a search bar, zoom controls, and a 'SHARE' button. The MazeMap logo is in the bottom right of the map overlay.

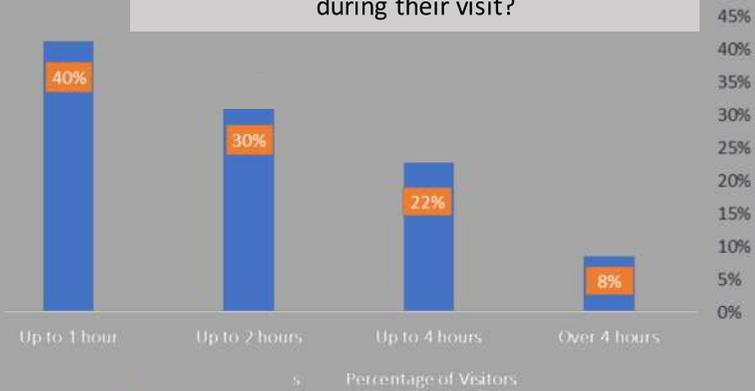
# Open Day



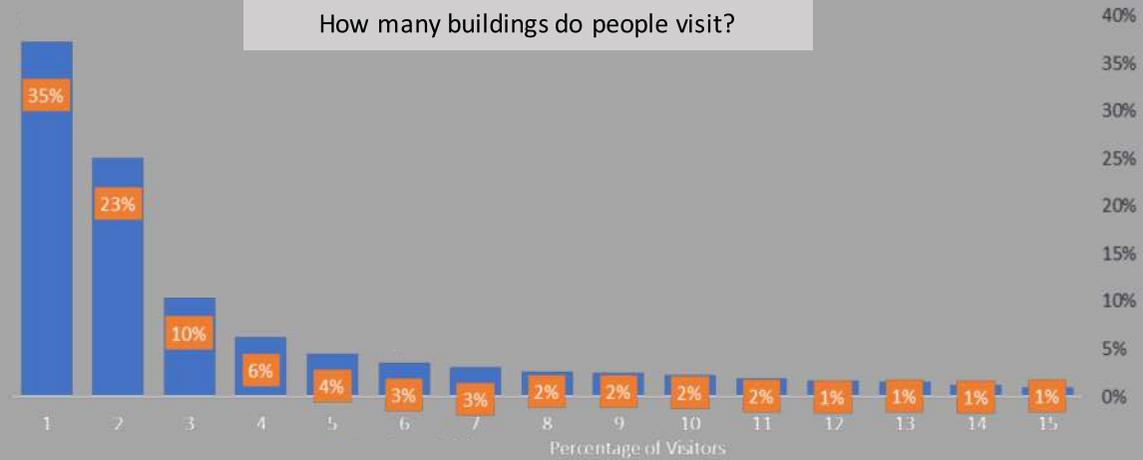


# Open Day Analytics

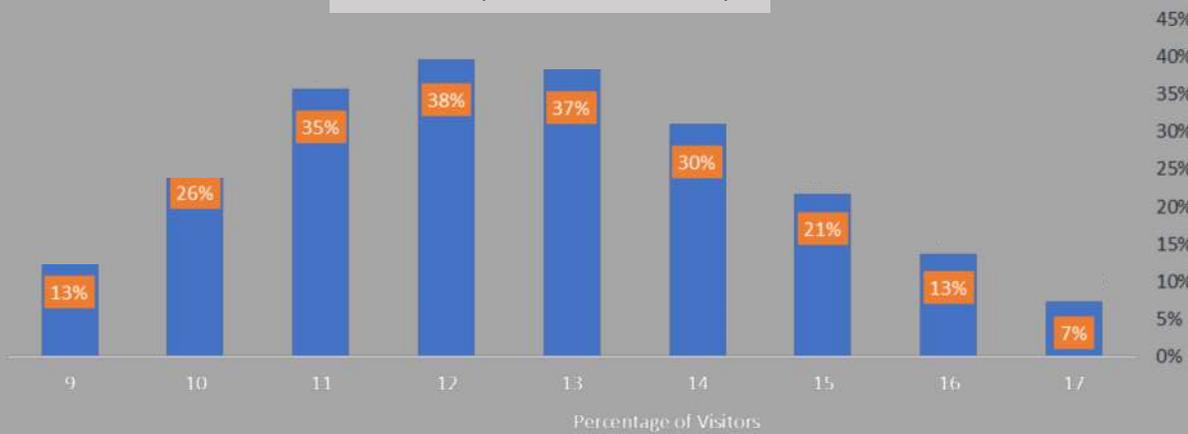
How much time do people spend on campus during their visit?



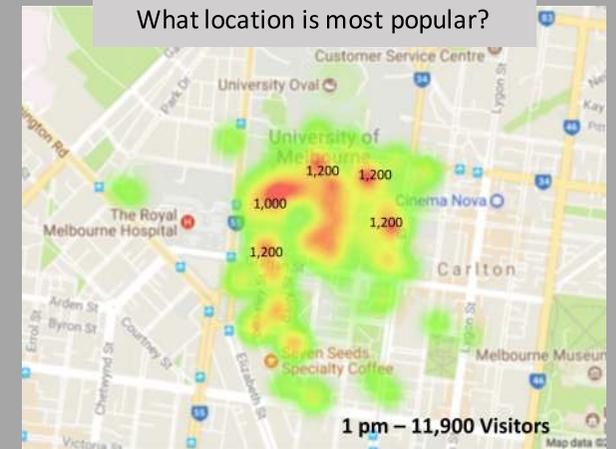
How many buildings do people visit?



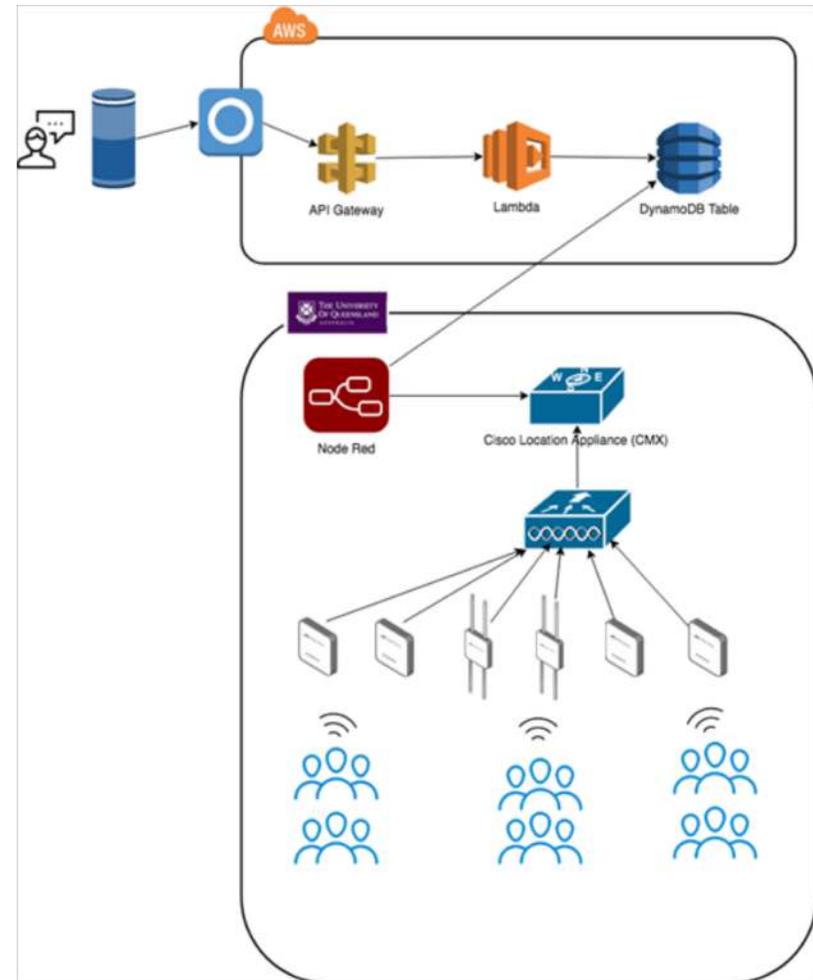
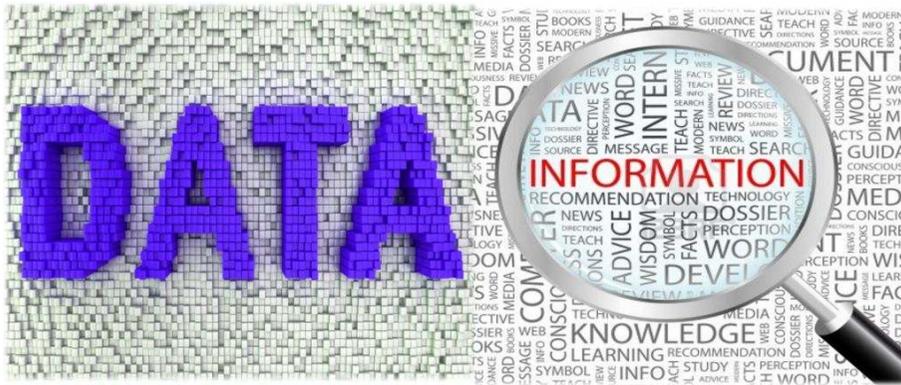
Visitation pattern across the day



What location is most popular?



# Enabling the Community





"Advanced  
Engineering  
is much  
busier than  
usual."



# Digitilising Spaces

# Digitising Physical Assets

Information  
Name, Description  
Priority

Set Conditions  
Location, Attribute  
Battery Level,  
Button Press,  
Telemetry

Operational Insights

820 Alerts ▲ Mark Krischer

Cancel Save

Information  
Updated: February 10th 2018

Name:

Description:

Priority: Low Medium High

Enabled:

Advanced:

ASSET FILTER

Filter assets by:  Department  Category

Apply to assets:

CONDITIONS

TRIGGER OPTIONS

Trigger after time:  Immediately

Trigger after count: Above  any

ACTIONS

Select Assets  
Filter by Department,  
Category

Select Triggers  
When rule fires

Take Action  
E-Mail, SMS  
HTTP POST  
Attribute Update

