



Real Time Operating Systems

UNIVERSITY OF IDAHO – JOHN C. SHOVIC, PHD

COEUR D'ALENE

Example IOT Presentation

Connected Coop





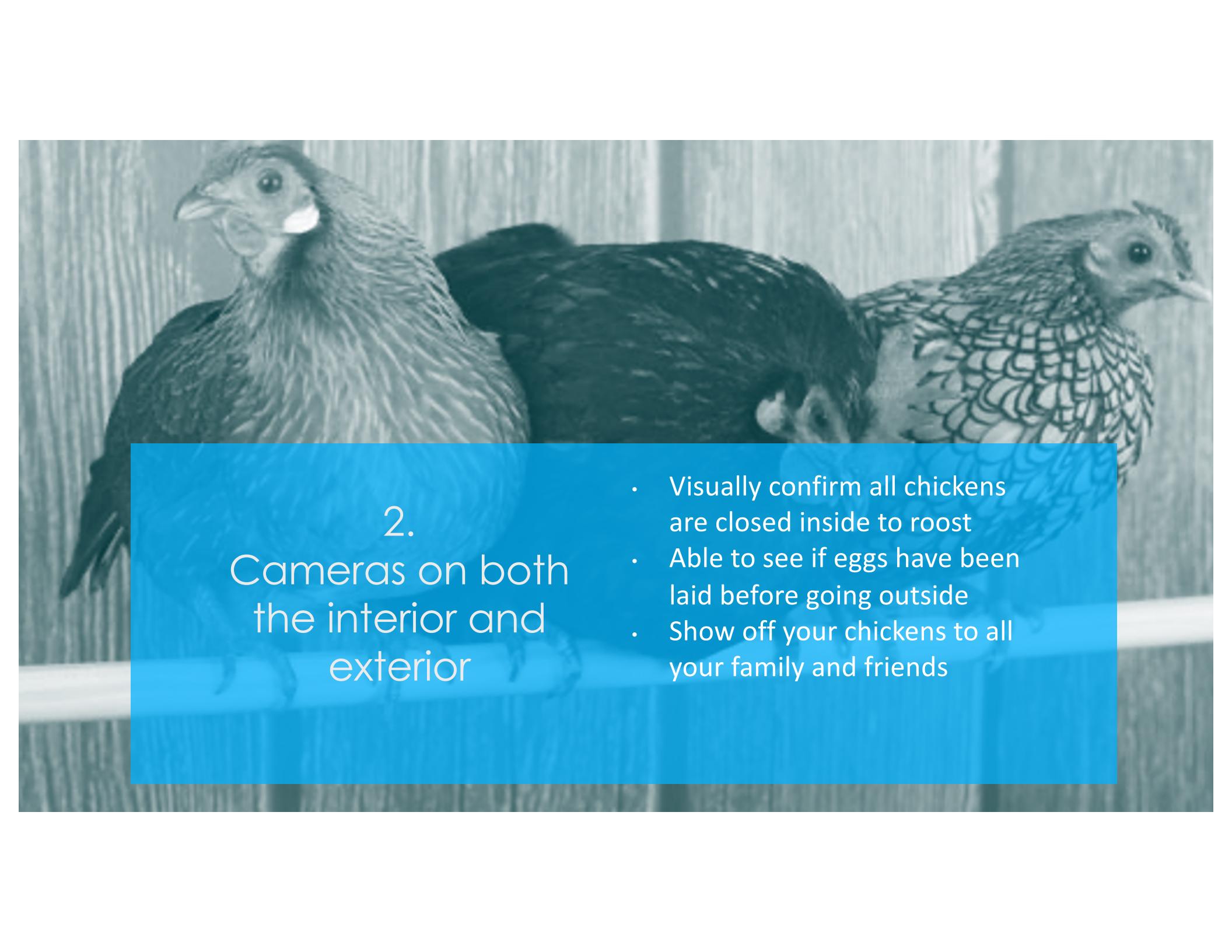
Why a connected chicken coop?

- Backyard chickens are becoming increasingly popular
- Connecting the coop to the internet would simplify raising chickens for your average working person – chickens can be fussy
- You would be able to manage your flock from anywhere – no need to be tied down by your birds



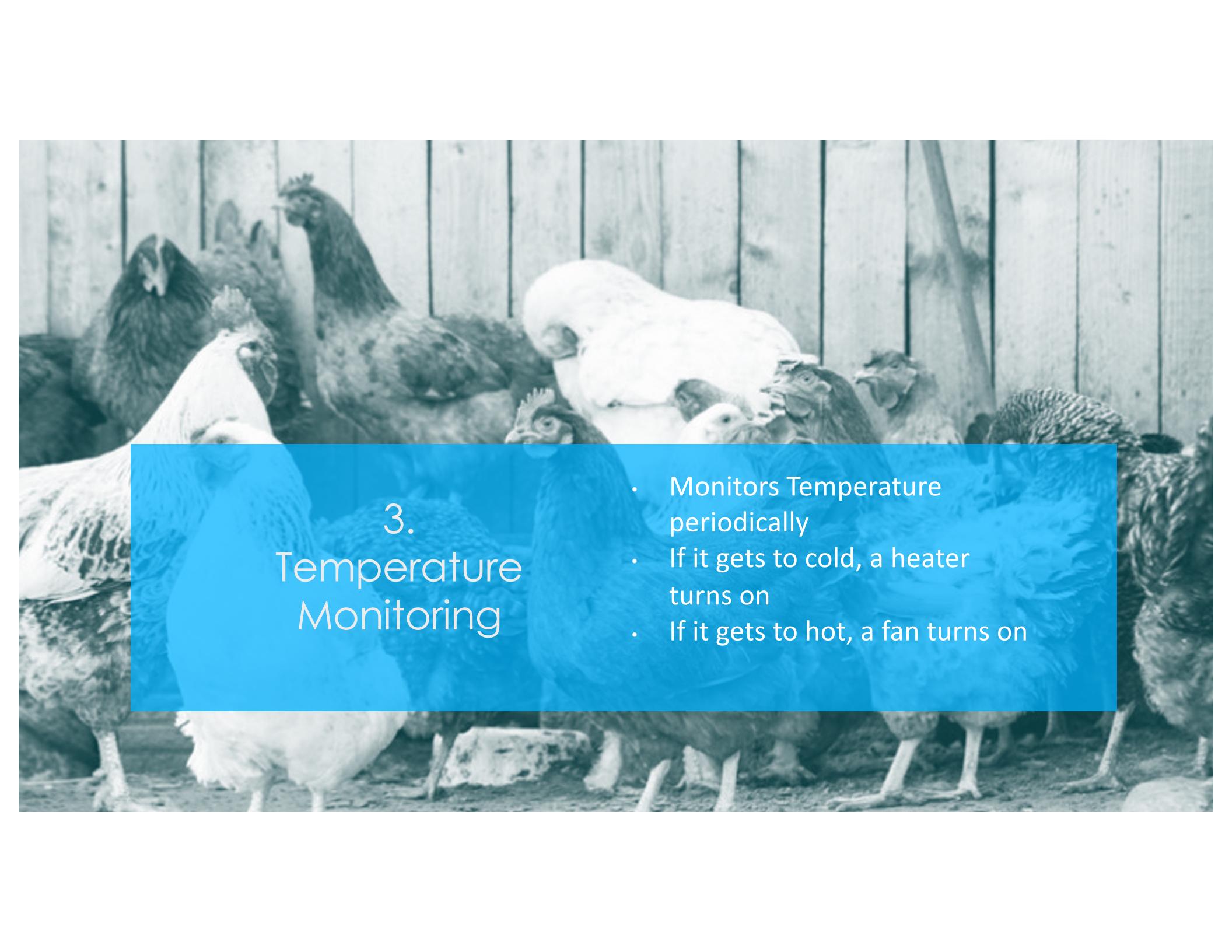
1. Remotely open and close the door

- Done through App
- Automatically closes after sunset if owner does not close

A photograph of three chickens standing in front of a light-colored wooden fence. The chicken on the left has a white comb and wattle, and its feathers are a mix of dark and light brown. The middle chicken is dark brown with a visible white patch on its wing. The chicken on the right has a prominent white comb and wattle, and its feathers are a mix of dark brown and black.

2. Cameras on both the interior and exterior

- Visually confirm all chickens are closed inside to roost
- Able to see if eggs have been laid before going outside
- Show off your chickens to all your family and friends

A black and white photograph showing a group of chickens in a wooden coop. Some chickens are in the foreground, while others are visible through the vertical slats of the wall behind them.

3. Temperature Monitoring

- Monitors Temperature periodically
- If it gets to cold, a heater turns on
- If it gets to hot, a fan turns on



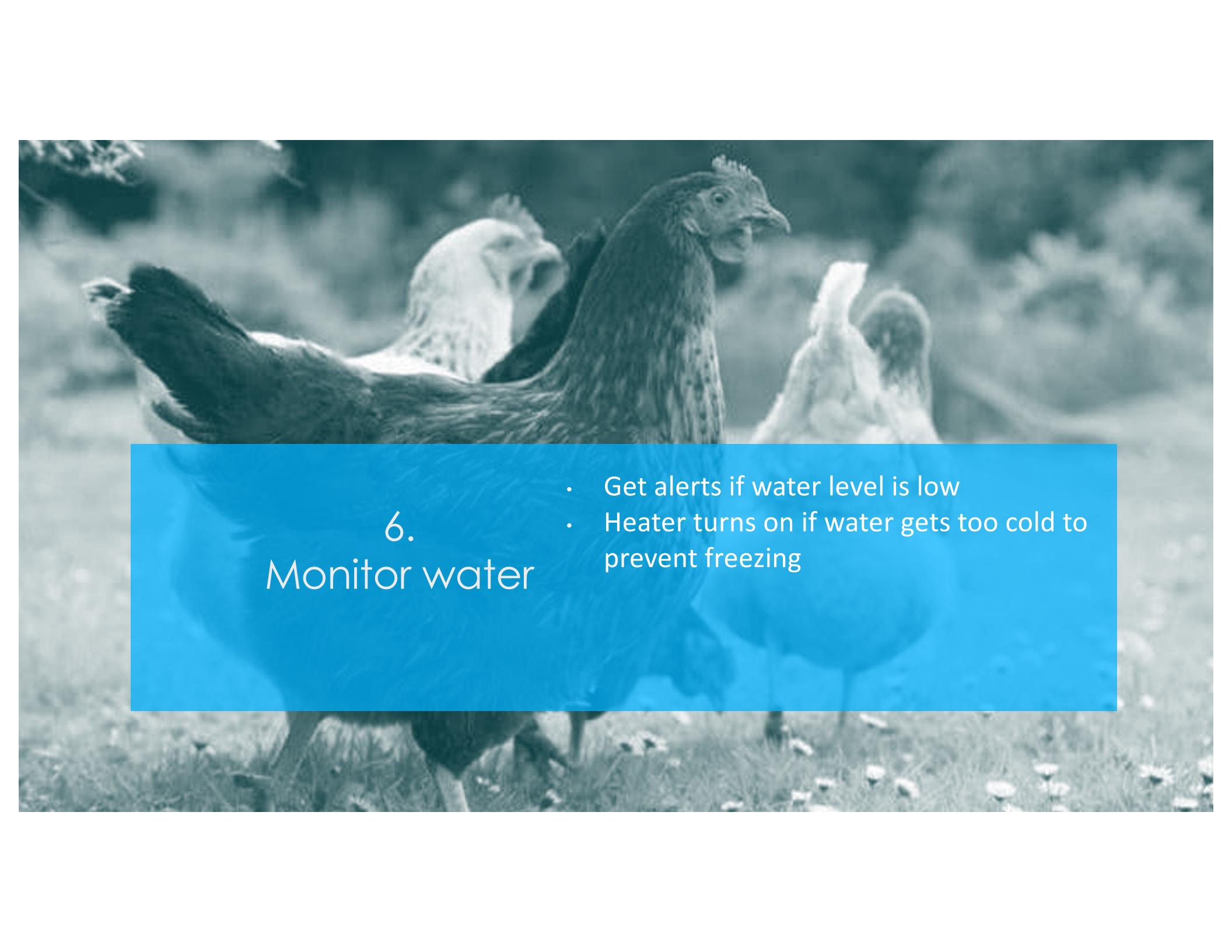
4. Controlled lighting

- Adjust lighting inside through the app – lighting affects egg production



5. Monitor and disperse food

- Disperse food with the push of a button
- If user doesn't disperse food for 24 hours, dispenser will auto dispense
- Get an alert once food level drops under certain levels

A black and white photograph of several chickens in a grassy field. In the foreground, a dark-colored chicken is facing left. Behind it, a white chicken is facing right. Further back, another dark-colored chicken is facing towards the camera. The background is filled with more chickens and foliage.

6. Monitor water

- Get alerts if water level is low
- Heater turns on if water gets too cold to prevent freezing



7.
Monitor air quality

- Track ammonia levels and get alerts when it is time to clean the coop

- Sold as custom builds – Can add as many sensors as the customer needs
- Some pieces could be sold as individual add-ons to existing coops - ex. The connected door





Thanks!

What's Missing?

- ▶ Block Diagram
- ▶ Marketing size estimate

How Important and hard will IoT be?

- ▶ As of 2018, there were just over 17 billion internet-connected devices in use worldwide. By 2025, this number is projected to balloon to more than 55 billion.
- ▶ Tripling the number of internet-reliant devices in the span of just seven years will place immense pressure on the world's existing networking infrastructure.
- ▶ Right now, 5G is the most promising solution to this connectivity challenge.
- ▶ Bluetooth is a local alternative
- ▶ Low-power, long-range wide area networks to improve IoT connectivity

IOT Market Sizes

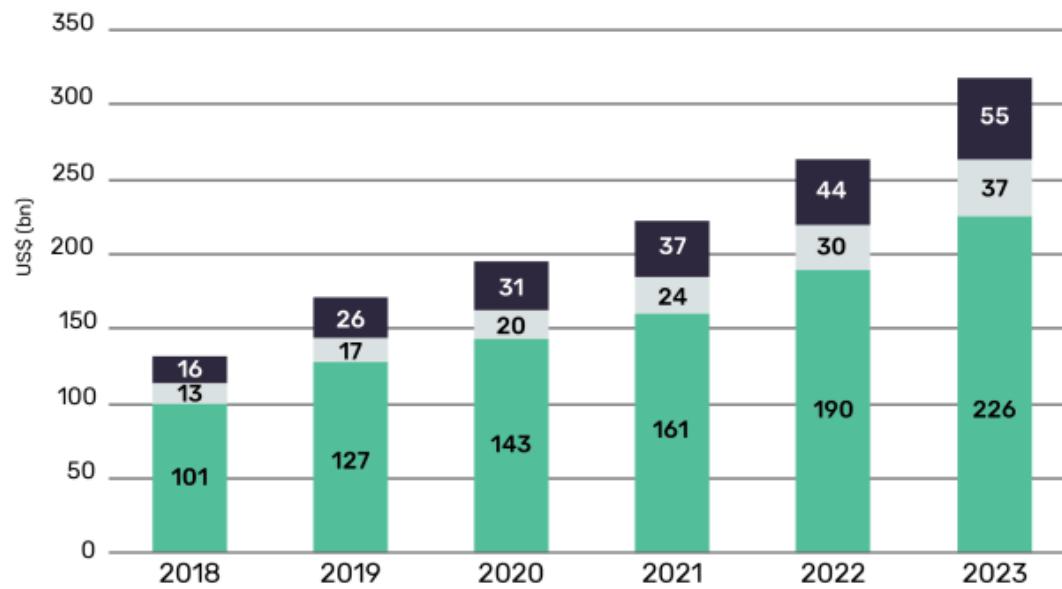
- ▶ Internet of Things (IoT) Market to Reach US\$ 1111.3 Bn by 2026, at a Ferocious CAGR of 24.7%
 - Market is Predominantly Driven by Rising Adoption of AI and Machine Learning
- ▶ Note: These numbers include cell phone apps, not just specific devices

Global IoT revenue by
technology segment (\$bn),
2018-2023



GlobalData.

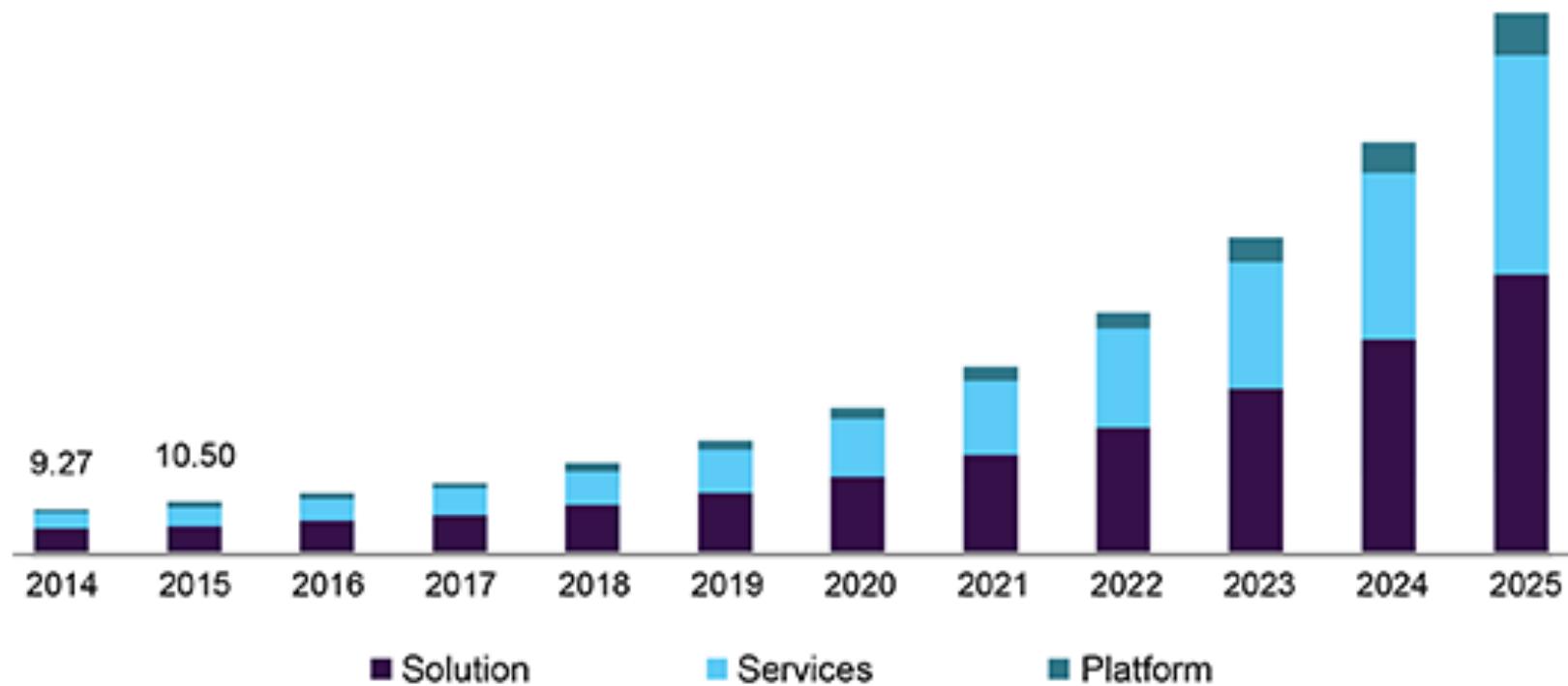
■ Software and services ■ Connectivity ■ Devices



Source: GlobalData, Technology Intelligence Centre

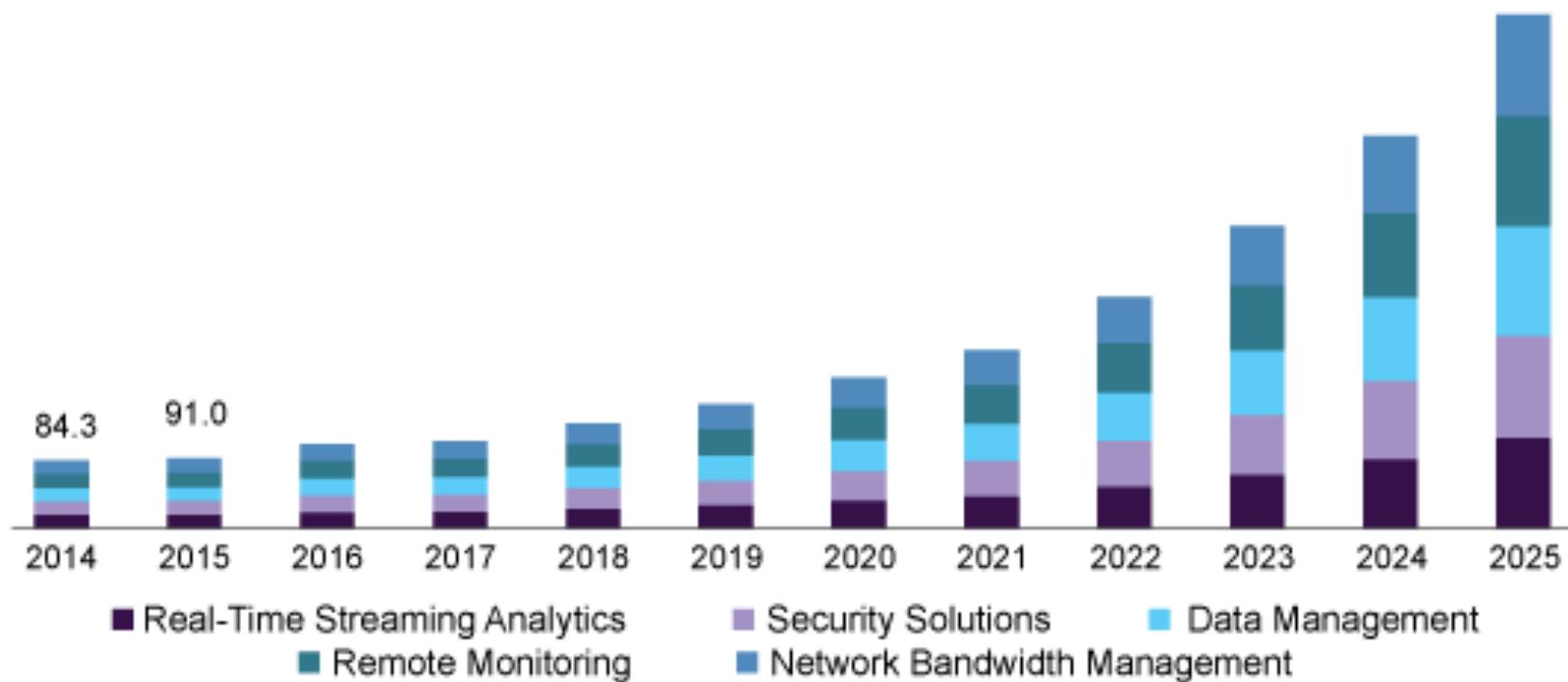


Germany industrial IoT market size, by component, 2014 - 2025 (USD Bill.)



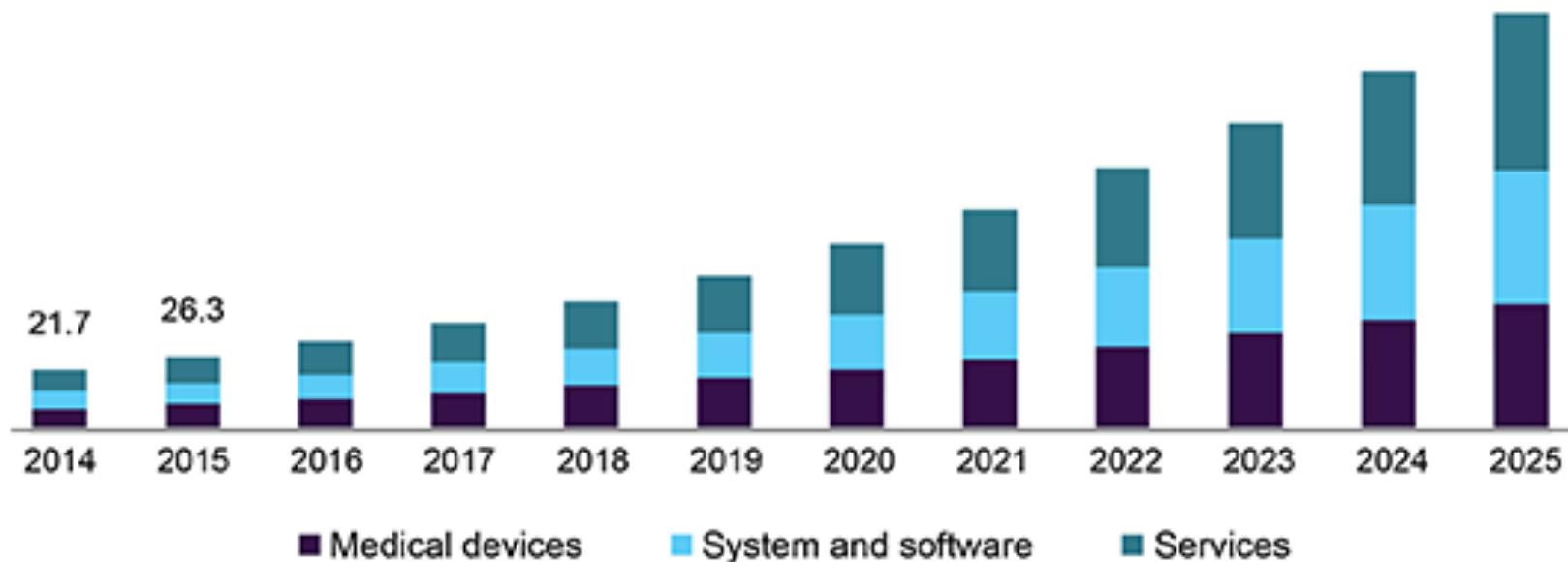
Source: www.grandviewresearch.com

North America IoT device management market, by solution, 2014 - 2025 (USD million)



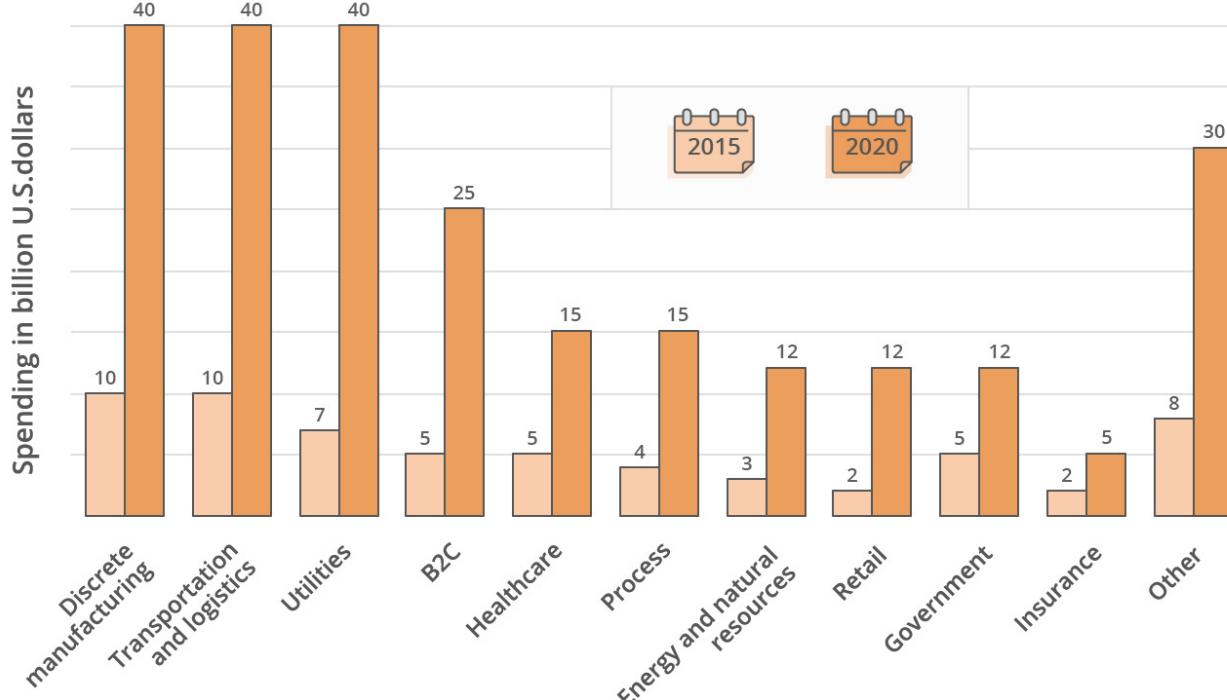


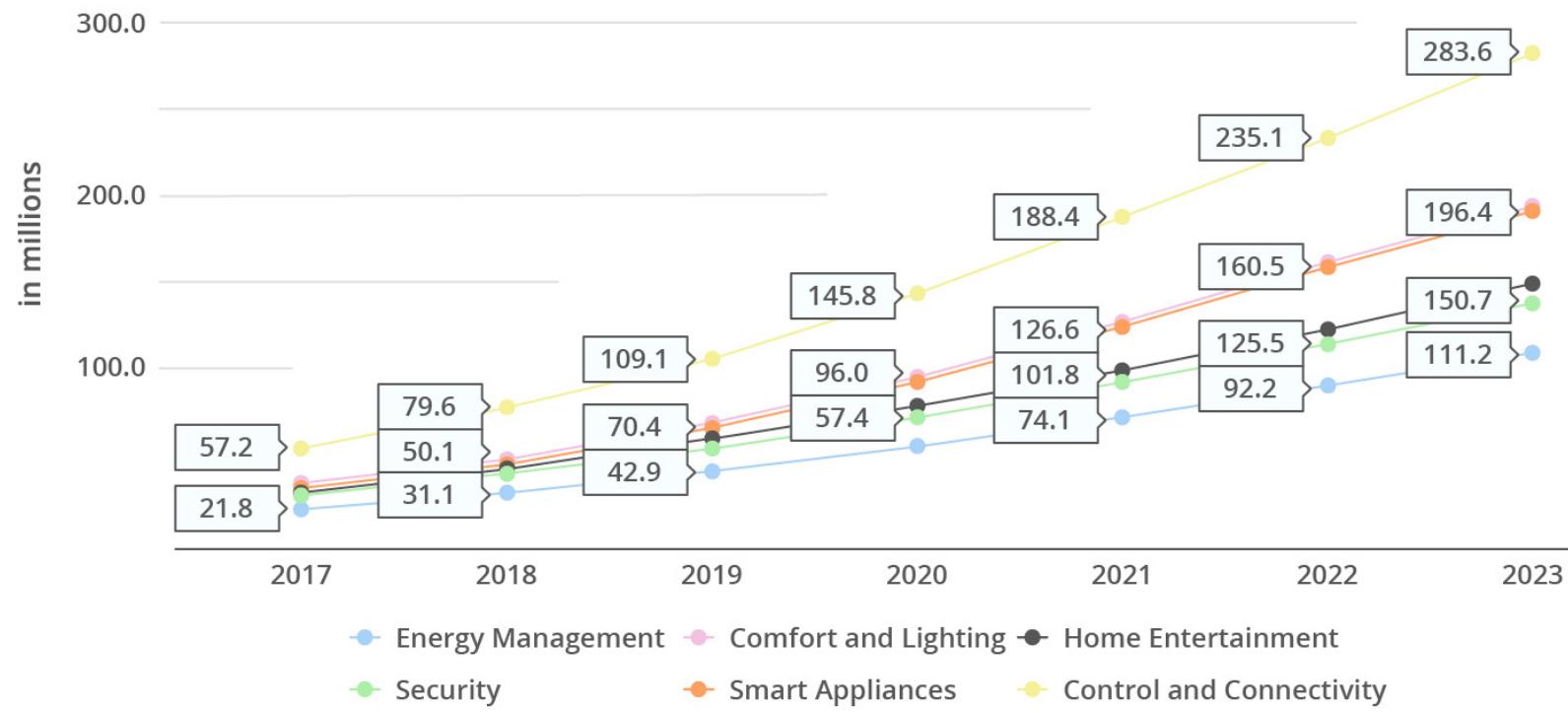
U.S. IoT in healthcare market size, by component, 2014 - 2025, (USD Bill.)



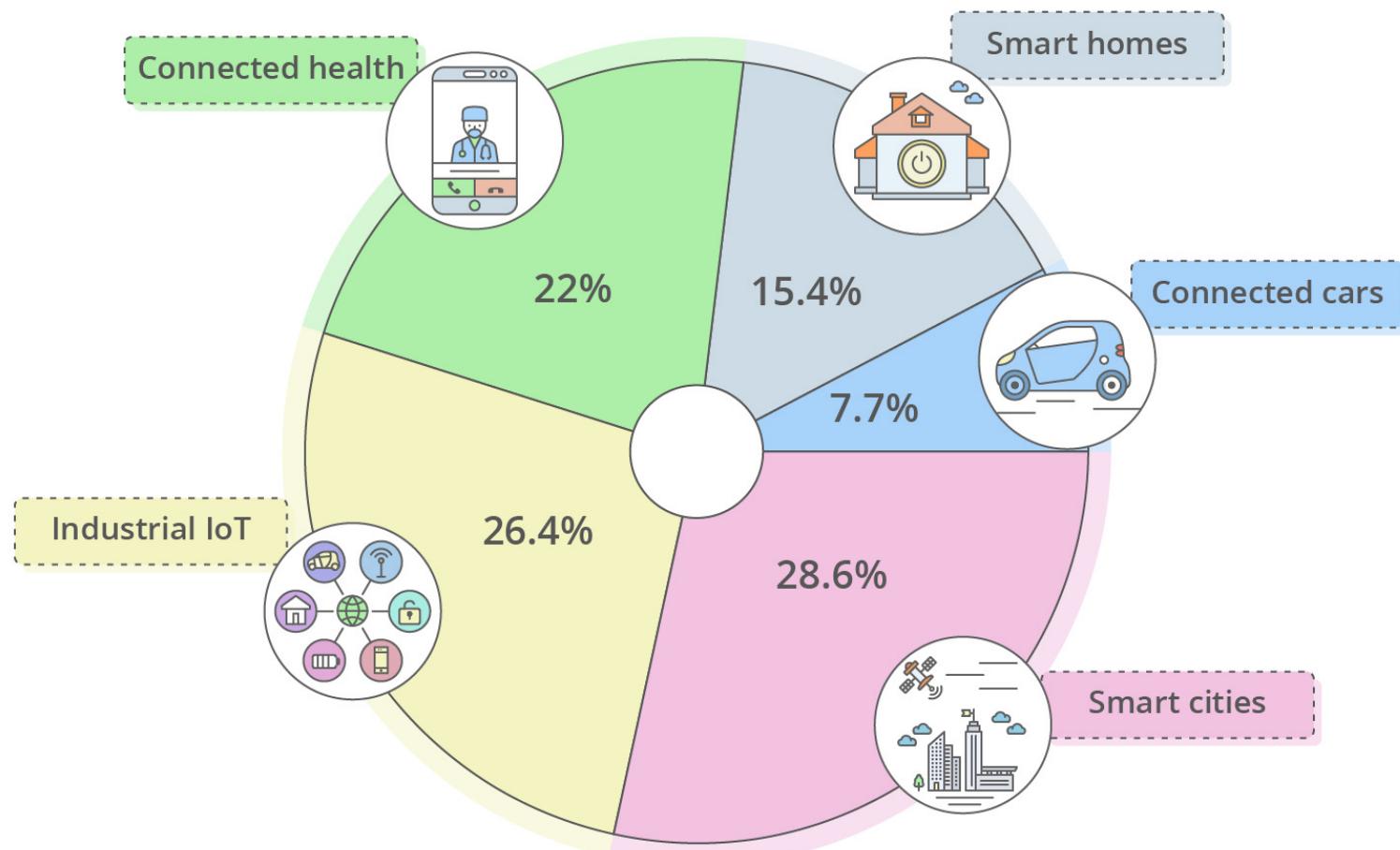
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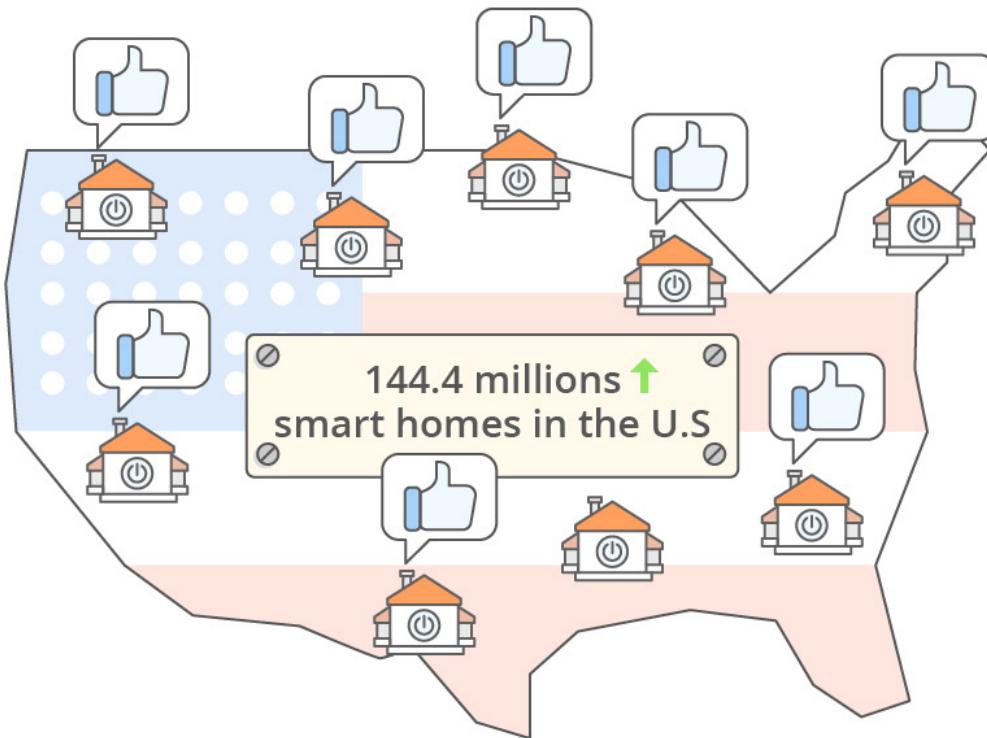
Global Spending on IoT by Industry in 2015 and 2020 (in Billions of USD)



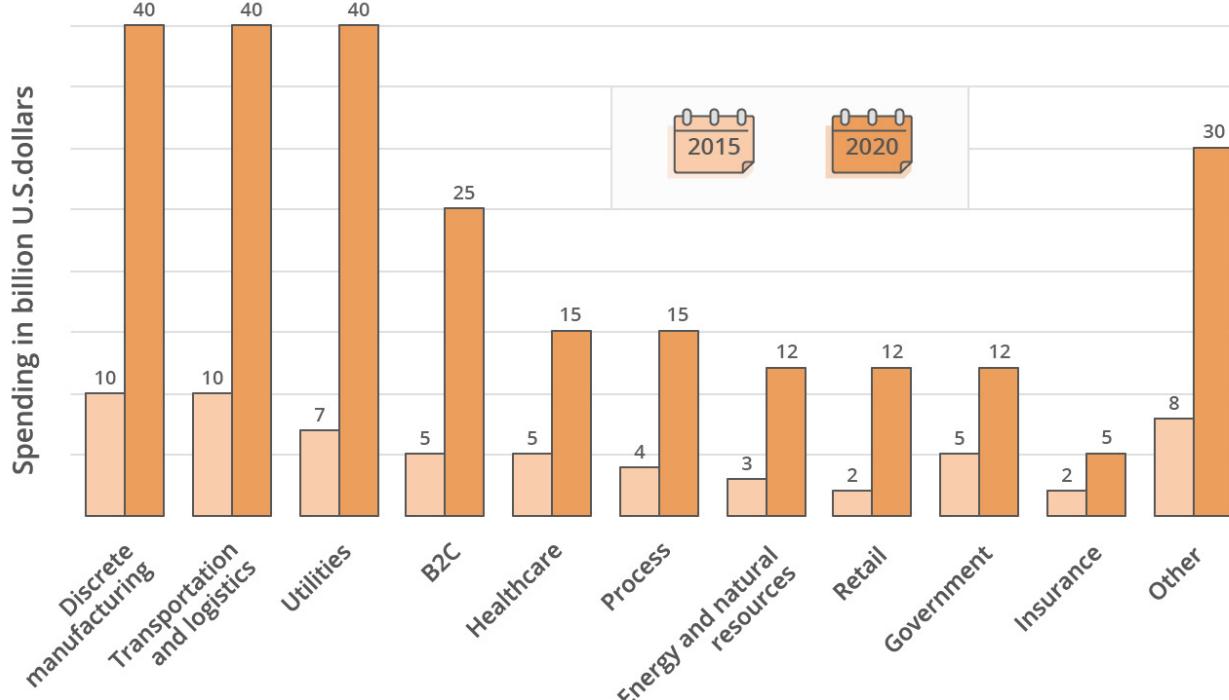


Global IoT market share

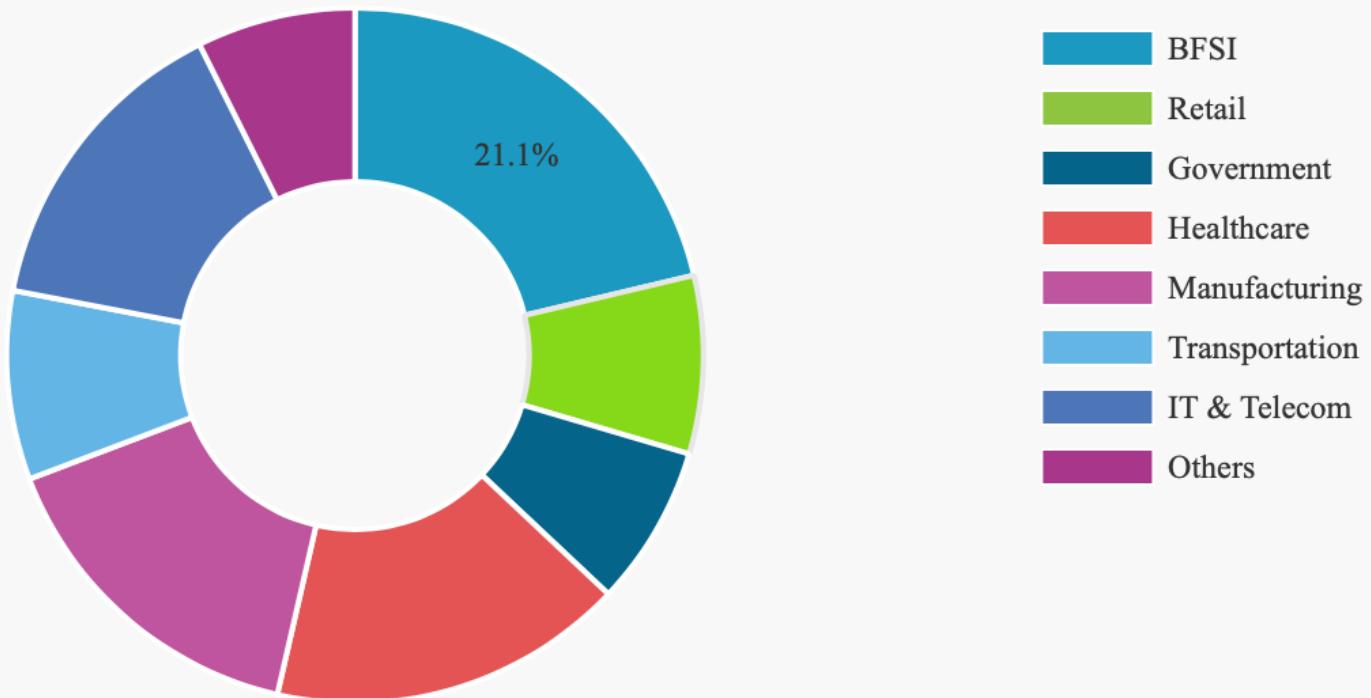




Global Spending on IoT by Industry in 2015 and 2020 (in Billions of USD)



Global End Use Industry Market Share, By End Use Industry, 2018



Three Keys to a Successful IOT Deployment

- ▶ IoT deployment and connectivity requirements
- ▶ IoT deployment and security concerns
- ▶ IoT deployment and capacity demands

Three Barriers to IoT Deployment

- ▶ **Data Collection:** In 2019, one-third of all developing IoT solutions will be abandoned due to the lack of analytic capabilities and data management. Unfortunately, only about 10% of unstructured generated data is worth salvaging for analysis.
- ▶ **Operational Costs:** Operational costs make up a large part of people's concerns with IoT adoption. 50% cite IoT implementation as a top barrier, 44% cite maintenance, and 43% cite integration of legacy technology.
- ▶ **Data Security:** Studies show that 30% of Information Technology (IT) professionals cite security as the main obstacle for IoT adoption. In fact, 84% of organizations have experienced some sort of IoT-related security breach. To combat this, IoT security solutions are projected to grow to \$840 million by 2020.

Current IOT development in the news?

- ▶ Apple and Google pair up for a contact tracing app (never really worked)
- ▶ Going to be app and then in the operating system
- ▶ Privacy is paramount they say!
- ▶ You opt-in to a tracing pool
- ▶ If you are next to a fellow tracing app, the app notes that (using Bluetooth)
- ▶ Sidesteps location data
- ▶ Only public health organizations can access. Covered under HIPAA?
- ▶ The Apple version did work – July 2022
- ▶ Korea's version DID WORK!
- ▶ China's version is mandatory.

Some Current IOT Deployments

- ▶ Amazon Alexa, Google home, apple
- ▶ BC Hydro – 1.8 million remote meters (Itron in Spokane builds these)
- ▶ Coca Cola – Picking system for orders 7.5Million a year (\$2M in capital savings, 10% increase in worker productivity, and accuracy of 99.8%)
- ▶ Rio Operations Center – Smart City / Traffic, services, emergency response
- ▶ Dom Perignon and the Savoy Hotel, London, UK – Custom bottle with IOT device built in for orders and refills
- ▶ Rio Tinto Mine, Western Australia – 54 autonomous trucks over three mines and long haul autonomous railway
- ▶ Vandal Food robots

What to look forward to:

- ▶ IOT Presentation schedule will be posted later today on Canvas.
Your slot is your slot. No late submissions.
- ▶ Oral exam slots are posted.
- ▶ No Final Test