

Minimizing noise at our datacenter operations

Datacenters provide the physical infrastructure for the technology we depend on at work and in our personal lives. Whenever you open an app on your phone, join a virtual classroom or meeting, snap and save photos, or play a game with your friends online, you are using a datacenter. Local businesses, government, hospitals, and schools rely on datacenters every day to deliver you goods and services.

Understanding datacenter sound sources

Microsoft datacenters typically have three sources for datacenter sound: Employee vehicles and occasional truck deliveries, backup generators, and heating, ventilation, and air-cooling equipment (HVAC).

Backup generators

Microsoft datacenters are designed to use generators as a backup power source. This solution ensures the online services provided by the datacenter can be accessed during electric power outages.

Infrequent usage

While the backup generators run infrequently, we do need to perform brief monthly, quarterly, and annual testing.

Added attenuation

We also add sound attenuation to the generator design. Attenuation is another way

When Microsoft joins a community to host a datacenter, we bring our commitments for a better world. Microsoft datacenter operations are key to our sustainability goals of being carbon negative, water positive and producing zero waste by 2030.

We also strive to be good neighbors in the communities where we operate and our employees live and work. We design our datacenters to operate responsibly and that includes leveraging new technology and solutions to ensure our datacenters operate as quietly as possible.

to describe how we insulate the sound waves from traveling. By taking this special measure, we reduce our generators to operate at 72 decibels on average (dbA), which can be compared with a standard power lawn mower. 72 dbA is also the noise volume if you are located within a few meters of the running generator. Typically, neighbors or community setbacks are hundreds of meters away and therefore the sound is insignificant.

HVAC equipment

Microsoft datacenters house thousands of servers. Those servers generate heat during normal operation; to avoid overheating, the heat needs to be removed using air or water. The type of cooling selected is based on several factors like climate, air quality and water scarcity. Where we can, we pull in outside air for cooling. For warmer locations or if water is scarce or if air quality is poor we use mechanical chillers.

Air handling units

New datacenters are designed for the air handling units (AHUs) to be built inside of the buildings. This means the sound from the fans can be heard inside of the building only.

Air cooled chillers

As outlined above we install air-cooled chillers when necessary. To mitigate noise impact, we work with engineering teams to understand and meet the local regulation requirements for noise.

Minimal employee and delivery traffic

Unlike distribution warehouses, datacenters do not have around the clock truck traffic coming and going but might receive occasional deliveries of machinery, parts, or office supplies, once operational. With datacenters employing approximately 50 employees per building, across a 24/7 period, the parking lot traffic is also minimal.

Datacenter decibel levels

Data reflects sound level design specs at close proximity.

Backup generators within enclosures

- **Purpose**—Keeping the datacenter online during a power outage
- **Run frequency**—Seldom
- **dB**A = 72*
- **Sound comparison** = Power lawn mower

Air handling units

- **Purpose**—Cooling airflow to datacenter servers
- **Run frequency**—24/7
- **dB**A = 0 (Cannot be heard outside the facility as units are inside)

Chillers

- **Purpose**—Cooling in warmer climates or water stress or air contamination
- **Run frequency**—varies
- **dB**A = 80-90*
- **Sound comparison** = Slightly louder than a power lawn mower

**with sound attenuation implemented*