

A close-up photograph of a woman in a white lab coat adjusting a hearing aid on the ear of another woman. The woman being adjusted is smiling and looking down. The background is slightly blurred, showing what appears to be a clinical or laboratory setting. A large, semi-transparent blue circle is overlaid on the left side of the image, containing the text.

Demant

Hearing Health – Future Perspectives *Advances, innovation and challenges in R&D*

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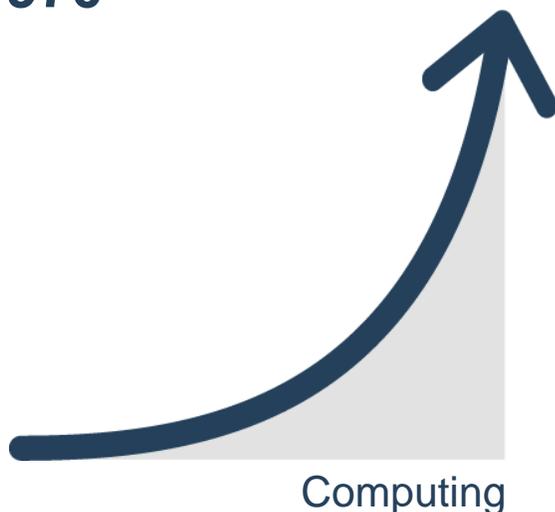
Passion for Technology

Making a difference for people living with hearing loss using state of the art technology is what drives our R&D organization

Getting feedback from end-users and customers motivates and engages us

Exponential growth accelerates breakthroughs in Tech

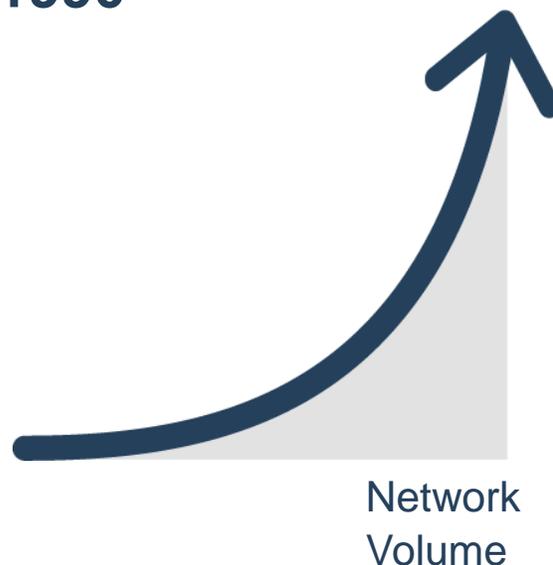
1970



Moore's law

The observation that the number of transistors in dense IC doubles about every two years

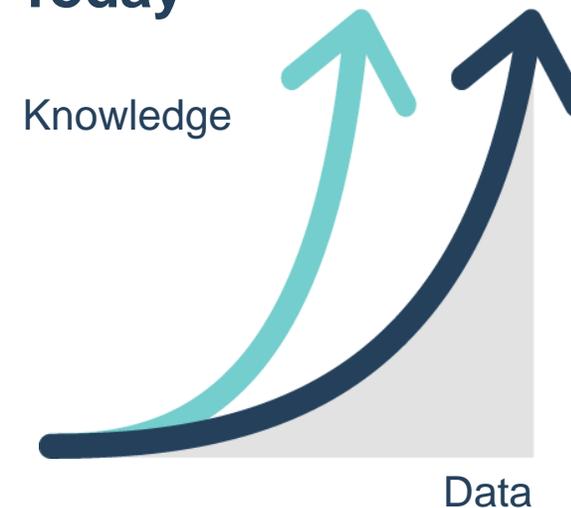
1990



Metcalfe's law

The effect of a network is proportional to the square of the number of connected users

Today



“Watson's” law

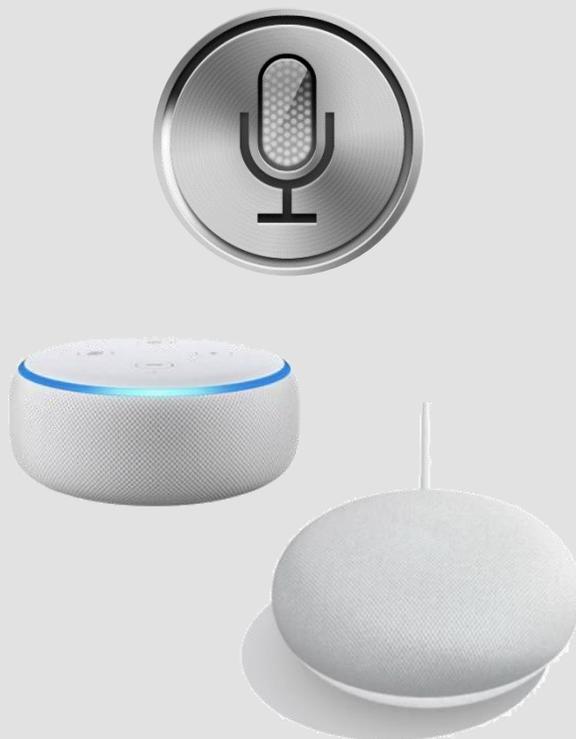
Take data, add AI to it and get exponential learning; ability to out-learn everybody else

Consumer electronics trends

Artificial Intelligence



Voice control



Sensors



Artificial intelligence

- **Self-driving and self-parking cars**
 - Object detection and predictions
 - **Photography**
 - Identification of facial features for focus
 - Improvement of focus, colors etc.
 - **Face recognition**
 - Access to smartphone instead of fingerprint
 - Recognition of people in photos
-

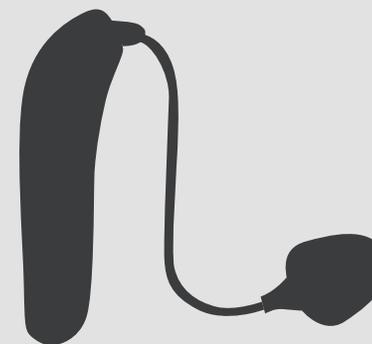
The future hearing instrument – AI processing

TODAY



- Optimized algorithms and detectors
- Fitting based on audiogram, diagnostics and personal preferences
- Adaptation management

FUTURE



- The intuitive hearing solution
- Life-long adaptation through learning based on personal sensor input, context, and cloud data
- Combining sensors, wireless and AI
- Optimized automatic learning algorithms

Future in hearing healthcare

Fitting and counselling

Towards on-line benefits



Power

Shift to Rechargeability

Connectivity

Direct interface to all phones and consumer devices

Audiology – continuous innovation



Intelligent algorithms

- Reducing the unwanted, keeping the essential
- Superior feedback management



Improving speech detection and reducing noise

- A natural 360-degree experience
- Towards normal and even super hearing



Recreating the perception of nuances

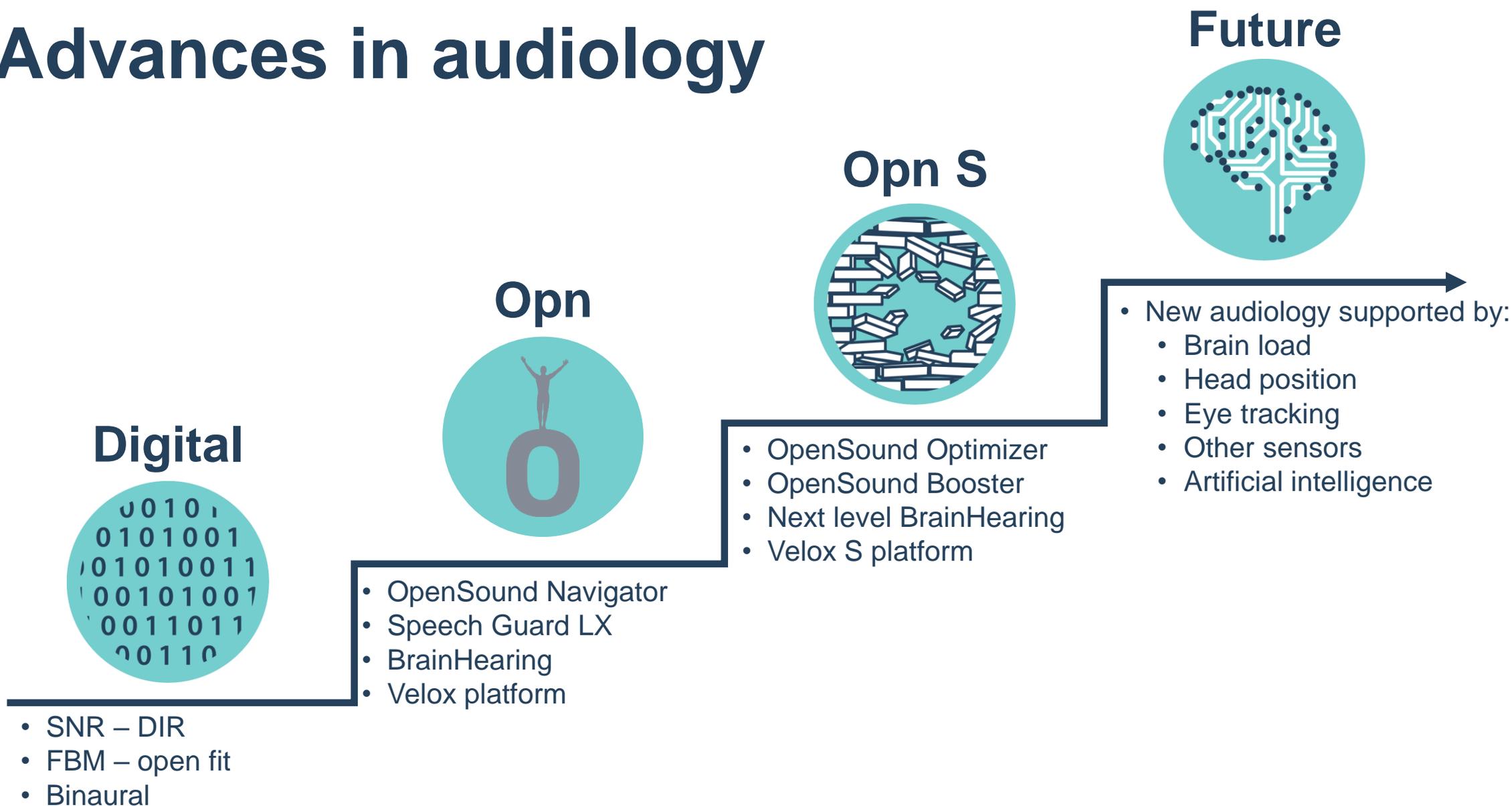
- Hearing impaired have low dynamic range
- One size does not fit all – personalization and adaptation



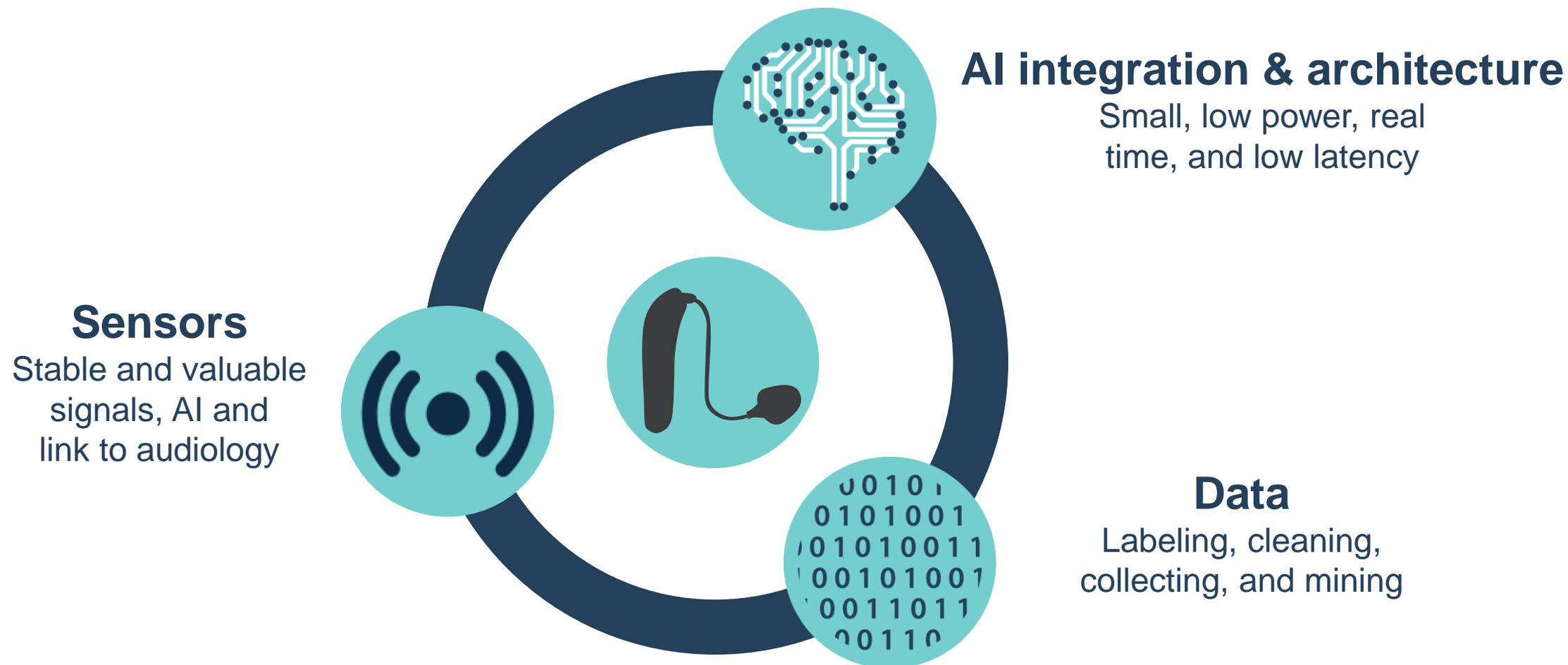
Full-day experience – 20 hours' wearing time

- Optimizing the brain load – avoid fatigue
- Comfort – in fit and sound

Advances in audiology



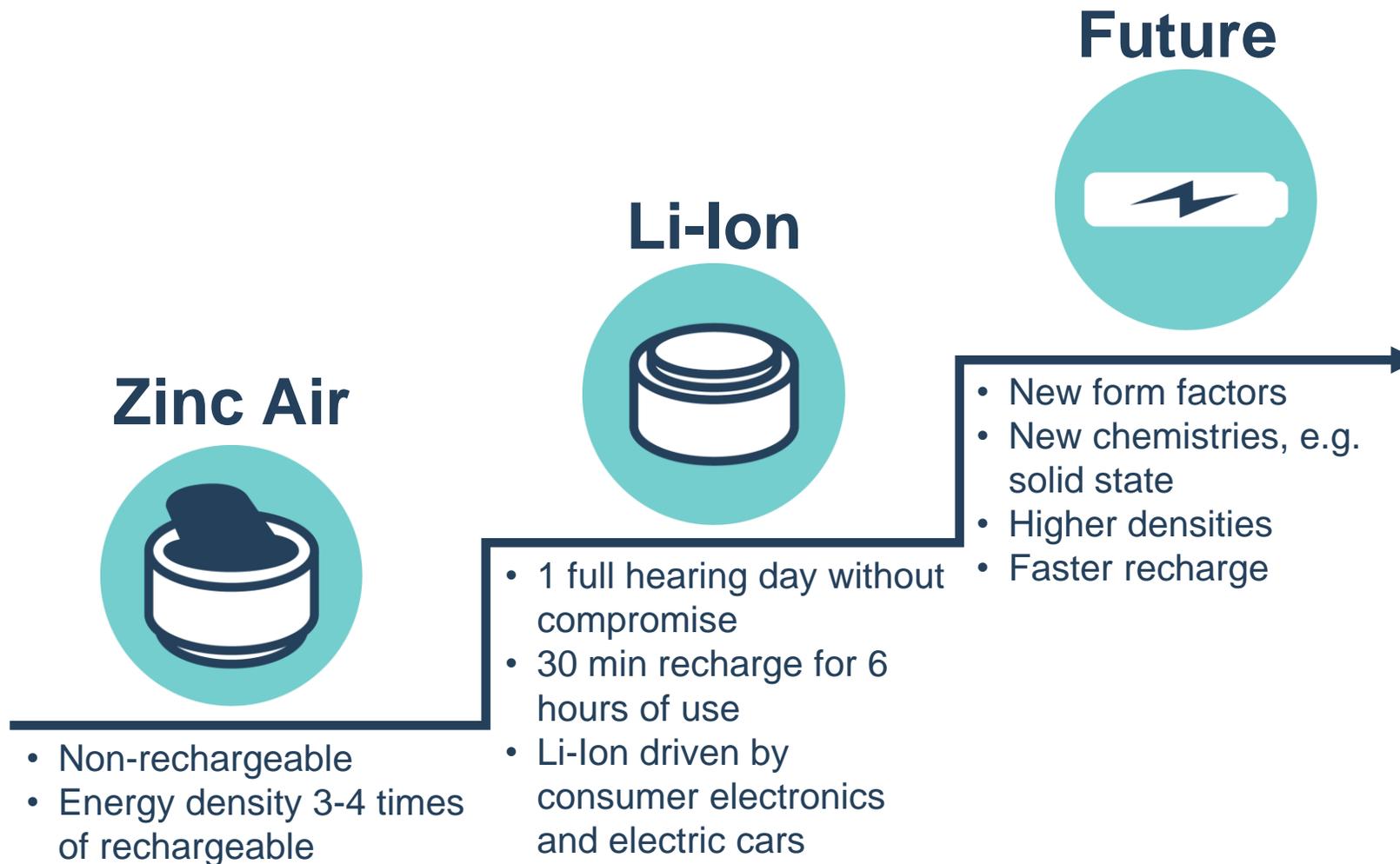
Future technology in audiology



Future in hearing healthcare



Power – advances in battery technologies

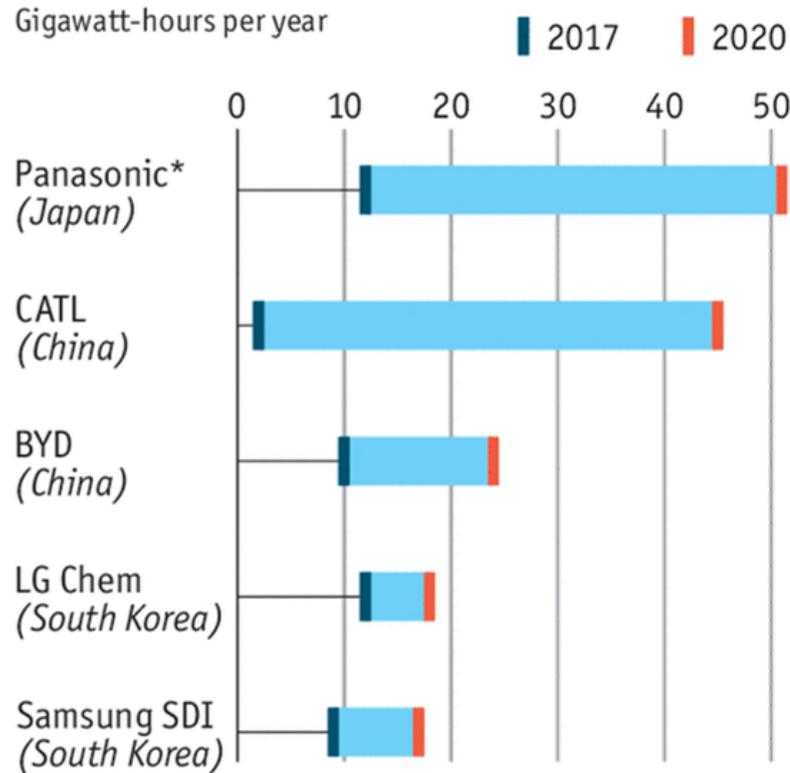


Battery capacity increase at lower cost



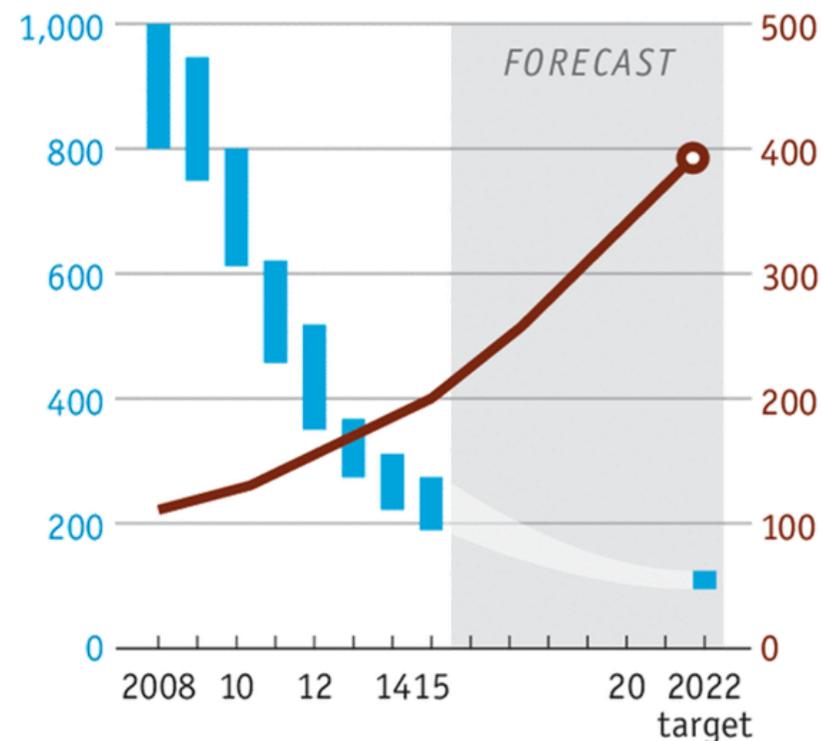
Electric dreams

Manufacturing capacity
Gigawatt-hours per year



Sources: Cairn ERA; US Department of Energy

Battery cost
Worldwide, \$/kWh



Battery energy density
Watt-hours per litre

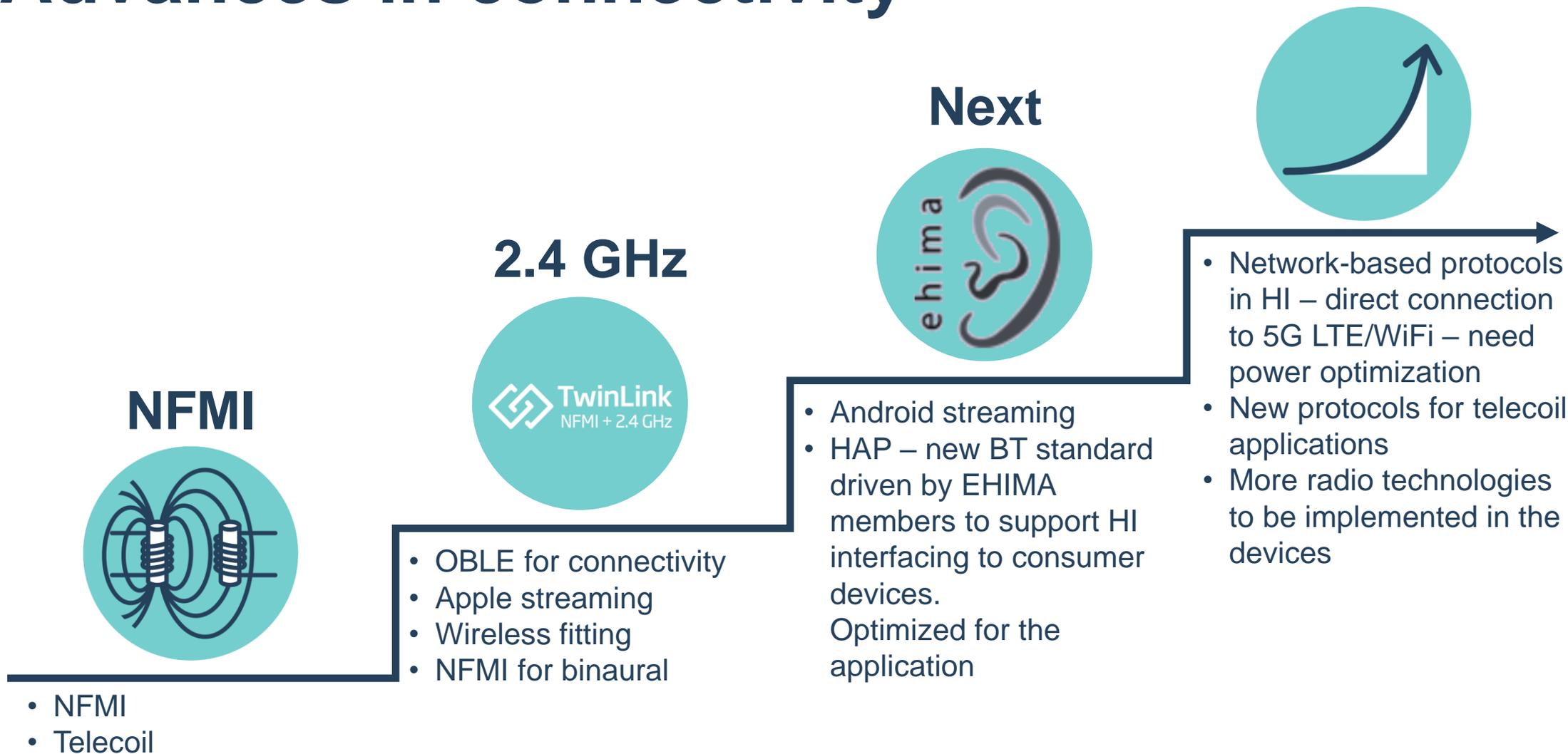
*Includes Tesla gigafactory

Source: <https://www.economist.com/graphic-detail/2017/08/14/the-growth-of-lithium-ion-battery-power>

Future in hearing healthcare

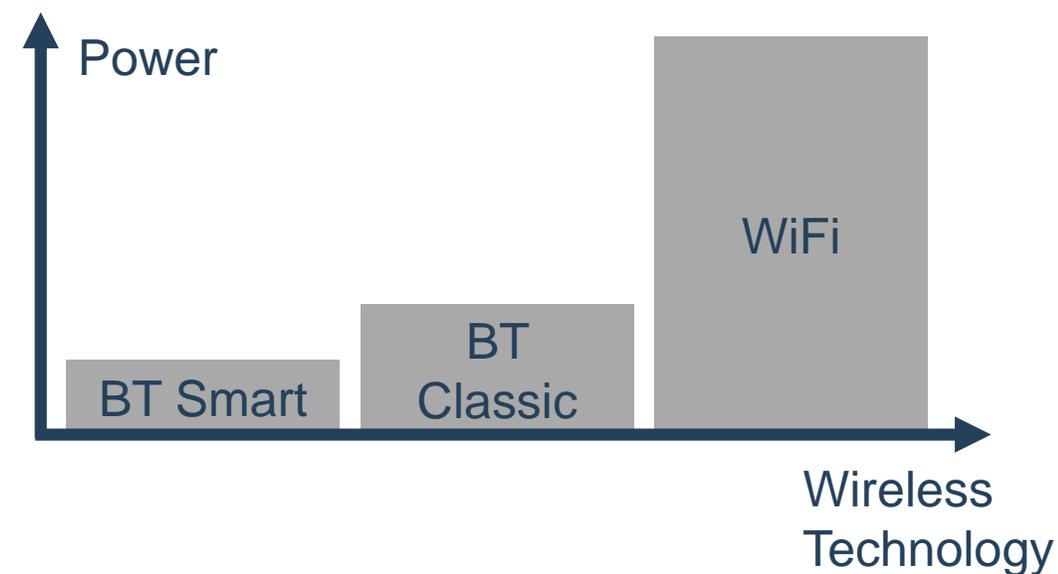


Advances in connectivity



Wireless overview

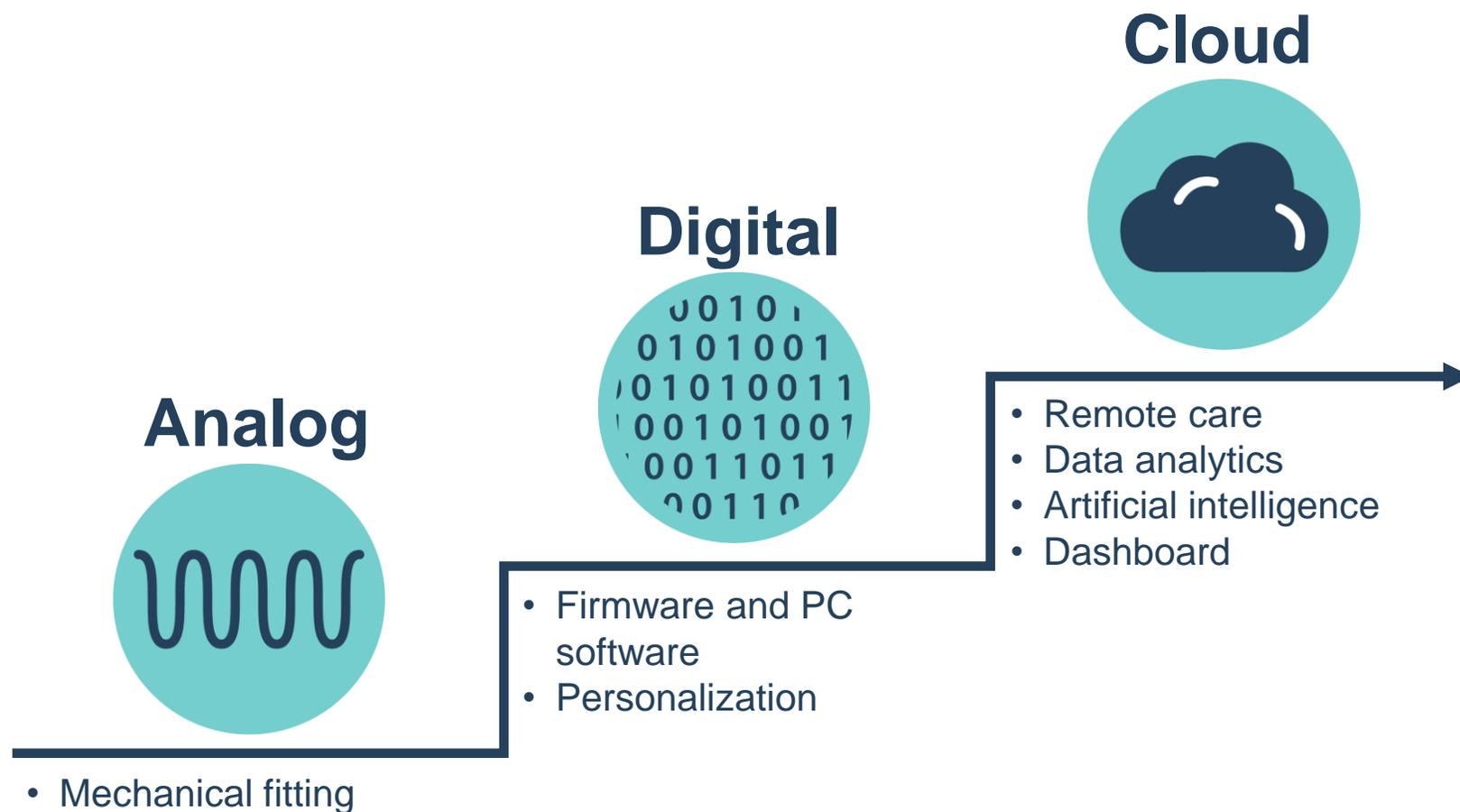
	BT Smart (LE)	BT Classic	WiFi
Coordinated audio connections supported	2	1	1
Power consumption	50%	100%	300-400%
Development cycle	First phase	Final stages	Mid-life



Future in hearing healthcare



Fitting and counselling

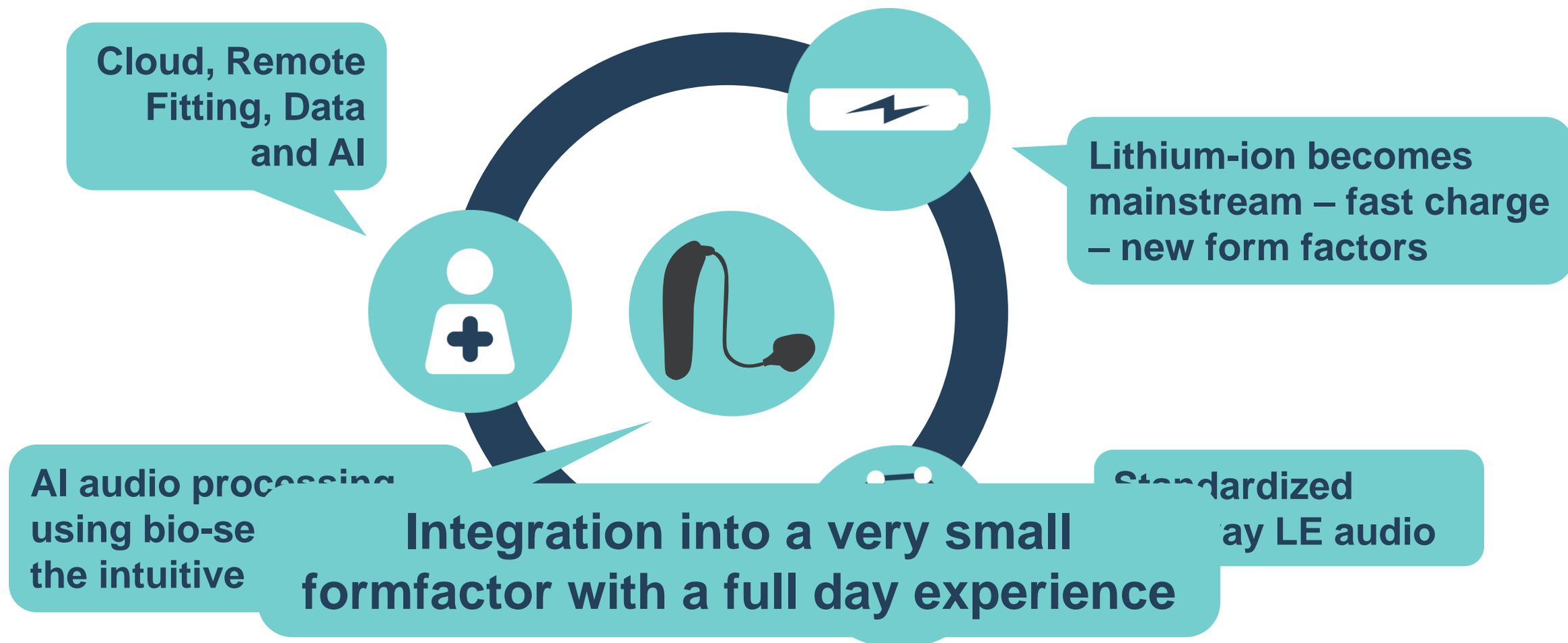


Remote Fitting

- HCP conducts remote fitting of patients
 - Follow-up appointments remotely
 - See, hear and text
 - Perform fine tuning of HIs
- Available on iPhone, iPad and Android Devices



Key take-aways



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Thank You