

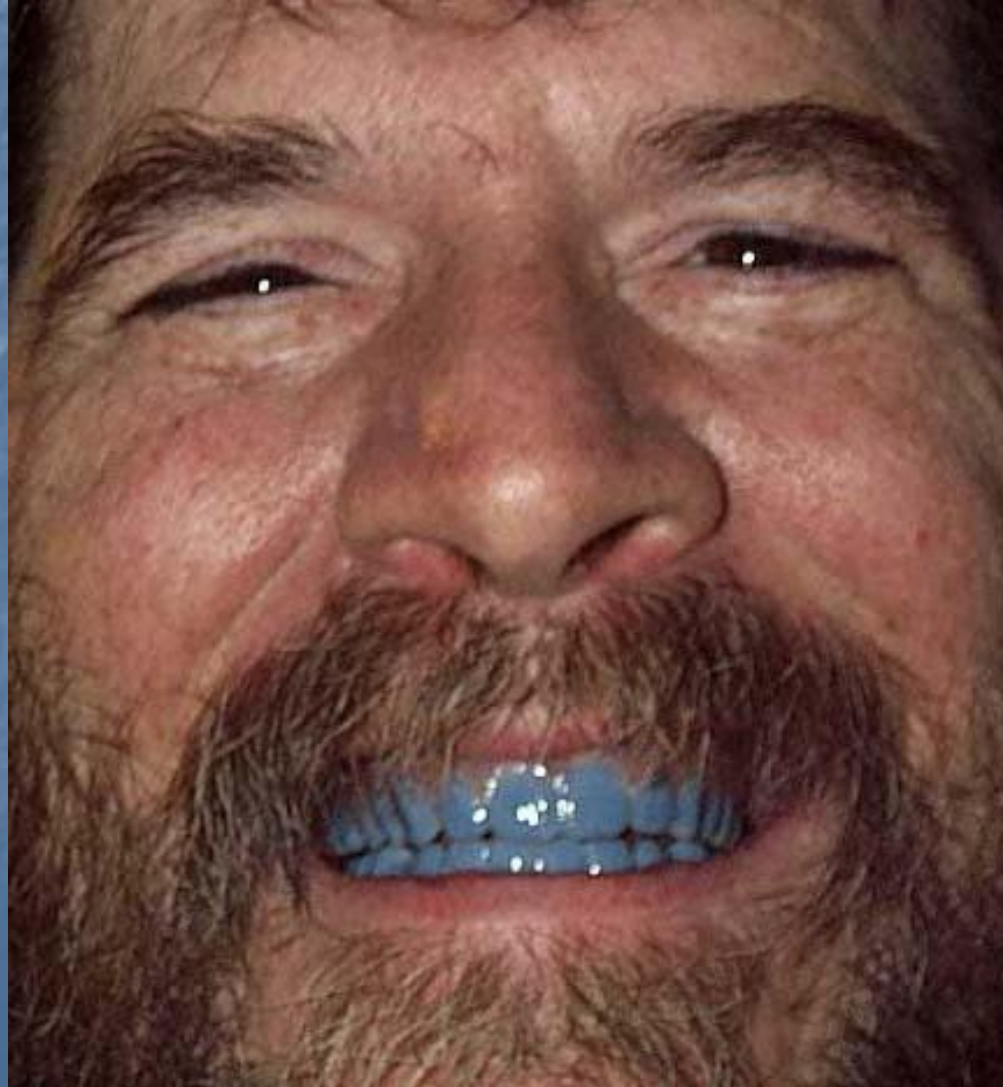
Bluetooth is not a disease *but there is a cure.*

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Overview

- Goals for this presentation:
 - Answer the question “What is Bluetooth?”
 - How Bluetooth works
 - What is a Bluetooth profile and why you should care
 - Limitations and considerations
 - Currently available Bluetooth solutions
 - How to introduce Bluetooth to your practice

What is Bluetooth?



Browntooth?



History of Bluetooth

- In 1996, a group of technology companies came together to develop a unified standard for cell phones and computers to communicate.
- The original technology was invented in 1994 by engineers working at Ericsson.
- When Bluetooth was officially introduced in 1998, its intended basic purpose was to be a wire replacement technology in order to rapidly transfer voice and data.

History of Bluetooth

- It was named after a 10th century Danish king, Harald Blatand, or *Harold Bluetooth* in English. He was famous for uniting warring factions of Sweden, Norway and Denmark. He it was also said he had an affinity for blueberries.
- The technology was almost called "Flirt". The tag line was to be "Getting close without touching"



What is Bluetooth?

- Bluetooth is a short-range wireless technology used to create personal networks
- It uses an unlicensed radio frequency bandwidth of 2.4 – 2.485GHz
- Many devices currently operate in the 2.4GHz range so interference can occur although it rarely happens

What is Bluetooth?

- To help reduce potential interference, it uses a frequency hopping spread spectrum signal that chooses the frequency with the least interference
- Bluetooth is omni-directional and is able to penetrate solid objects



What is Bluetooth?

- Bluetooth is used for a variety of applications, such as:
 - Wireless control and communication between a mobile phone and a wireless headset
 - Wireless communication between computers and input devices, such as keyboards, printers and mice

What is Bluetooth?

- Wireless replacement of serial port applications, such as GPS receivers and medical devices (i.e. – Noahlink)
- Wireless networking of computers, where small amounts of information exchange occur
- Wireless transfer of contact information and calendar details between mobile phones
- Wireless video game controllers

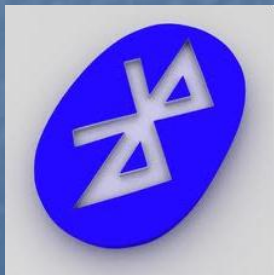
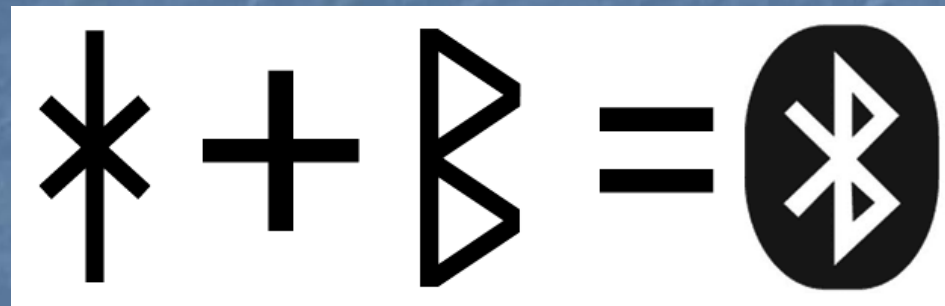


What is Bluetooth?

- There have been many versions of the standard and it is constantly evolving
 - Version 1.0 - *bad*
 - Version 1.1 - *better*
 - Version 1.2 - *usable (original RAZR used this)*
 - Version 2.0 + EDR - *passed in 2004 and finally allowed good headsets*
 - Version 2.1 + EDR
 - Version 3.0 + HS & Low Energy
 - Version 4.0 - *passed April 21, 2010*

What is Bluetooth?

- The symbol used to represent Bluetooth is a combination of Scandinavian runes representing King Harald's initials.



Who's got class?

- There are three classifications of Bluetooth:
 - **Class 1**
 - 100 mW maximum power consumption
 - 330 foot range
 - **Class 2**
 - 2.5 mW maximum power consumption
 - 33 foot range
 - **Class 3**
 - 1 mW maximum power consumption
 - 3 foot range

Who's got class?

- Generally, the range of the connection is limited to the range of the lowest device class.
- However, the range can be slightly lengthened due to the higher transmission power and sensitivity of the higher class device.
- Many audio transmitters are Class 1
- Mobile phones and wireless headsets are typically Class 2.

Pairing, Connecting & Grouping

- There are three terms that are frequently interchanged, however, they need to be clearly defined.
- **Pairing** is when a trusted relationship is established between two Bluetooth devices. The devices place each other on their "buddy list"

Pairing, Connecting & Grouping

- **Connecting** is when two previously paired devices recognize each other and start talking. Information can be shared between the devices at this point.



Pairing, Connecting & Grouping

- **Grouping** only occurs in the Phonak software. It is when an iCom is attached to hearing instruments to create a hearing system.



Getting paired up, and not by your parents

- Pairing occurs when two devices agree that it is safe to communicate with one another and create a connection
- To pair compatible devices, a shared passkey (password) is needed
- Once two devices are paired, they need not be re-paired unless either device is cleared or the pairing has been deleted

Getting Paired up, and not by your parents

- The pairing process is:
 1. Device A searches for another Bluetooth device
 2. Device B is found by Device A
 3. Device A asks for a passkey from Device B
 4. Device B sends the passkey back to Device A and creates a trusted pairing if both passkeys are the same

Getting paired up and not by your parents

- Since many devices don't have a keyboard, the generic code of 0000 is frequently used



Bluetooth: Where It Gets Confusing



Bluetooth: Where It Gets Confusing

Profiles

- Think of profiles as capabilities or features
- Both devices have to support the same profile for a feature to work
- There are many different profiles available

Bluetooth: Where It Gets Confusing

- The variety of profiles includes:
 - **Advanced Audio Distribution Profile (A2DP), Audio / Video Control Transport Protocol (AVRCP), Basic Imaging Profile (BIP), Basic Printing Profile (BPP), Common ISDN Access Profile (CIP), Cordless Telephony Profile (CTP), Dial-Up Network Profile (DUN), Fax Profile (FAX), File Transfer Profile (FTP), General Audio/Video Distribution Profile (GAVDP), Generic Object Profile (GOEP) Hands-Free Profile (HFP), Hard Copy Cable Replacement Profile (HCRP), Headset Profile (HSP), Human Interface Device Profile (HID), Intercom Profile (ICP), Object Push Profile (OPP), Personal Area Networking Profile (PAN), Service Discovery Application Profile (SDAP), Service Port Profile (SPP), Synchronization Profile (SYNC), Video Distribution Profile (VDP)**

Profile Soup

- Profiles important to you include:
 - **Headset Profile (HSP)**
 - **Hands-Free Profile (HFP)**
 - **Advanced Audio Distribution Profile (A2DP)**

Profile Soup

Headset Profile (HSP)

- This is the most commonly used profile and allows mobile phones to communicate with wireless headsets
- It only allows to ability to ring, adjust the volume, answer a call and hang up

Profile Soup

Hands-Free Profile (HFP)

- This is commonly used to allow communication with a car hands free system
- The extra features that HFP allows are last number redial, call waiting and voice dialing
- Most Bluetooth headsets support both HSP and HFP profiles.

Profile Soup

Advanced Audio Distribution Profile (A2DP)

- **This profile is used to define how high quality mono and stereo audio information is streamed from one device to another**
 - **Examples include:**
 - **Music from a mobile phone to a car audio system or a wireless headset**
 - **Audio from a television or stereo to a wireless headset**

Connecting on a more personal level

- Bluetooth generally is a one-to-one connection based on the profile. Two receiving devices cannot be connected to the same transmitting device at the same time.
 - For example, a husband and wife, each with their own BTR, would each need their own television transmitter.

Connecting on a more personal level

However, there are several receiving devices that allow connections with two transmitters using the same profile. This technology is called Multipoint.

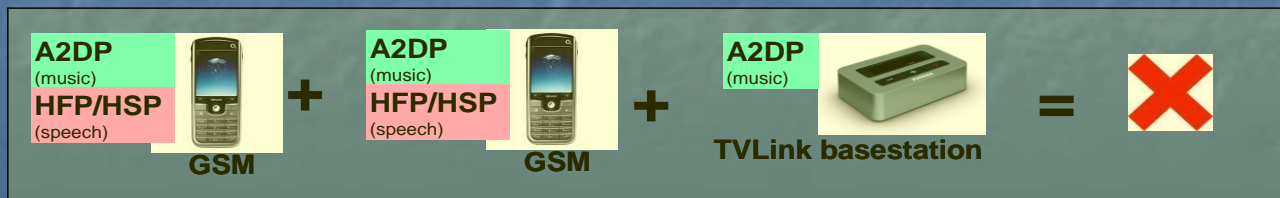
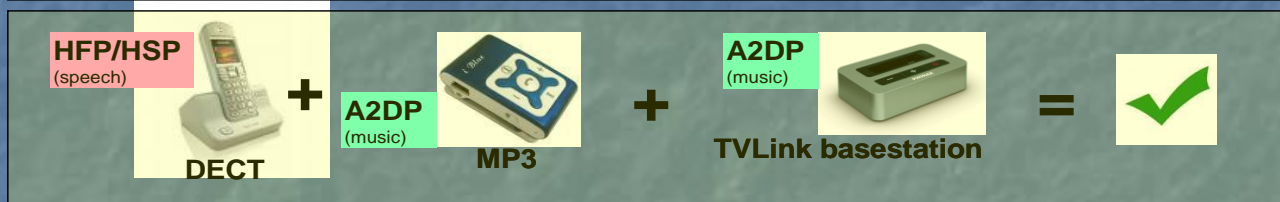
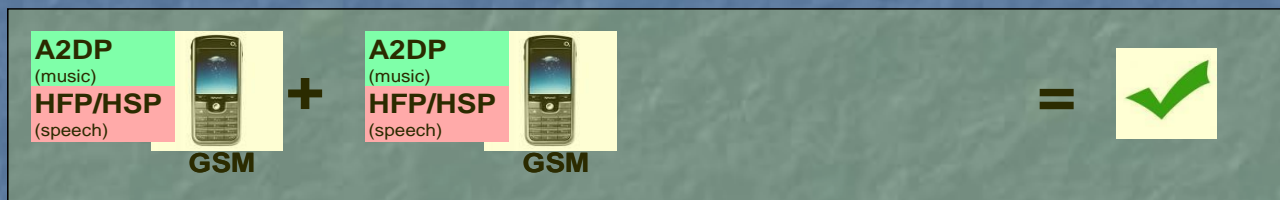
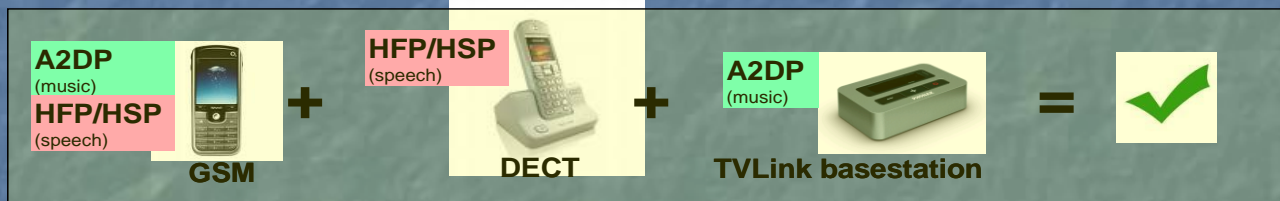
- For example, a Bluetooth ear piece can be set to receive calls on two separate cell phones.



Multipoint

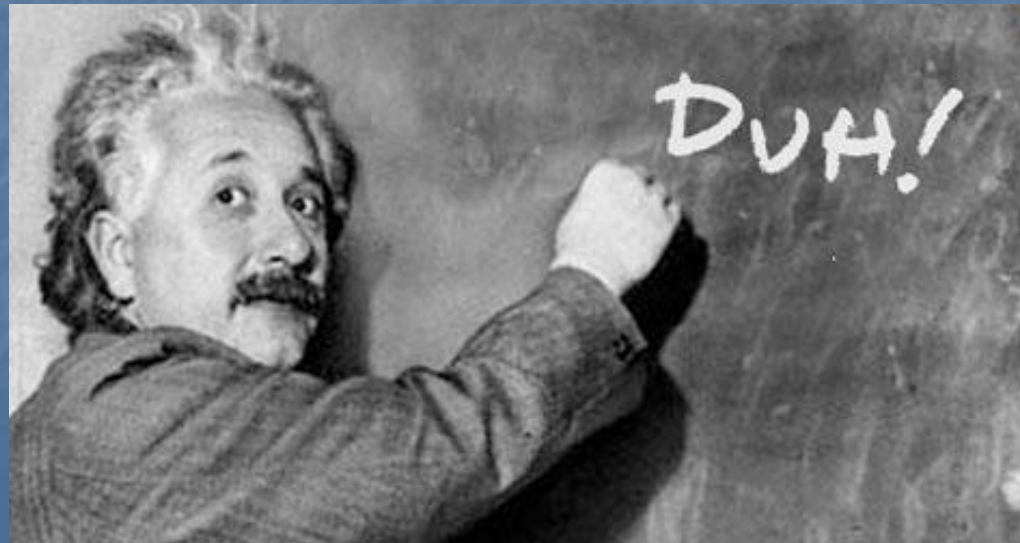
- This technology also allows a patient to maintain a connection to a cell phone while also being connected to a landline Bluetooth phone.
- When either phone rings, the BTR will notify the patient that a call is coming in and they can choose to receive it.
- However, Multipoint does not allow for conferencing of both phones.

Connecting on a more personal level



Why doesn't this \$%^&*^ thing sometimes not work?

- Make sure the devices have Bluetooth functionality or the Bluetooth radios turned on.



Why doesn't this \$%?!*&^ thing sometimes not work?

- Make sure profiles match
 - For devices to work together, it is important that each device share the same profile
- One of the most common causes for devices not to work together is when two devices do not support the same profile. Support in both devices is a requirement.

Why doesn't this \$%?!*&^ thing sometimes not work?

- Verify that the devices are actively connected. Enable auto-connect if available.
- Another common issue is that the Bluetooth device may already be currently connected to another device using the same profile that is needed to connect to a new device.

Why doesn't this \$%?!*&^ thing sometimes not work?

- Make sure that the devices you want to communicate are actually paired with each other



Why doesn't this \$%?!*&^ thing sometimes not work?

- Make sure the volume is turned up on the phone.
- Don't forget, an intermittent Bluetooth signal could actually be a bad cell phone signal.

Bluetooth Programmers

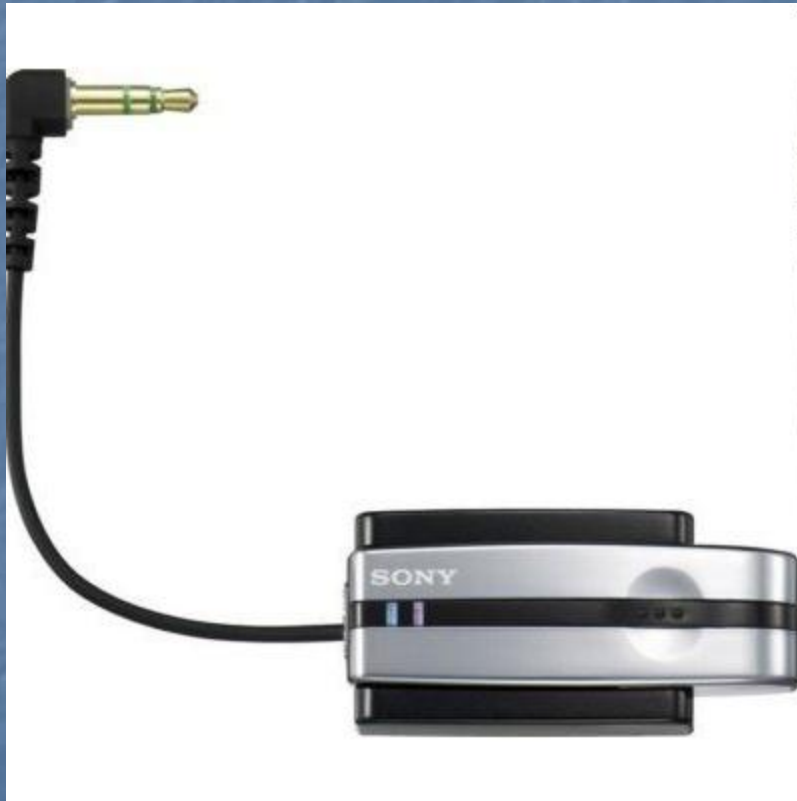
- NOAHlink



- Phonak iCube



Bluetooth Transmitters



- Sony tmr-bt10 MP3 player Bluetooth Adapter
- Used to output audio as Bluetooth audio

Bluetooth Transmitters

- Phonak TVlink
- Used to transmit audio from a TV or stereo as Bluetooth



Bluetooth Transmitters

- Siemens Tek Transmitter
- Used to transmit audio from a TV or stereo as Bluetooth



Bluetooth Transmitters

- Oticon
ConnectLine TV
Adapter
- Used to transmit
audio from a TV
or stereo as
Bluetooth



Bluetooth Transmitters

- Jabra Bluetooth Hub
- Bluetooth landline phone adapter
- Discontinued, but may be available in some places



Bluetooth Transmitters

- Plantronics Voyager 500A
- Bluetooth landline phone adapter



Bluetooth Transmitters

- VTech 6321



Bluetooth Transmitters

...nearly impossible for someone to eavesdrop

- Three handset system—includes 3 handsets and requires only one phone jack
- Expandable up to 12 handsets using only one phone jack—uses DS6301 accessory handsets
- Connect to BLUETOOTH® enabled cellular phones to make and receive cellular calls with the ease and comfort of a home phone system—avoid the mad dash to catch a cellular call before it goes to voicemail.
- BLUETOOTH® enabled for connection to cell phones and headsets
- Two cell phones can be actively connected to the base or one BLUETOOTH® headset; cellular calls can be made or received from either of these two active cell phones
- Pair four different cell phones or BLUETOOTH® enabled headsets to the base unit
- Caller ID/call waiting*—stores 50 calls
- Digital answering system—no tapes or moving parts
- 14 minutes of recording time
- Backlit message counter
- Blue backlit keypad and display
- Wall mount bracket included

Bluetooth Transmitters

- AT&T
TL92270
TL92370



Bluetooth Transmitters

- Panasonic
KX-TG6582T
KX-TG6583T



Bluetooth Transmitter/Receiver

- USB Bluetooth Adapter
- Used to add Bluetooth to a computer



Bluetooth Transmitter/Receiver



Bluetooth Receivers

- Phonak iCom
- Used to receive Bluetooth signals and transmit them to the hearing aids



Bluetooth Receivers

- Siemens Tek Connect
- Used to receive Bluetooth signals and transmit them to the hearing aids



Bluetooth Receivers

- Oticon Streamer
- Used to receive Bluetooth signals and transmit them to the hearing aids



Bluetooth Receivers

- ReSound Unite Phone Clip
- Used to receive Bluetooth phone signals and transmit them to the hearing aids



Bluetooth Receivers

- ThinkGeek Retro Bluetooth Headset
- Used to receive Bluetooth signals and transmit them acoustically



Demonstrating

- Here is one suggested way to demonstrate Bluetooth technology and its benefit.
- It will only marginally increase your time with the patient while being highly effective.

Demonstrating

- If the client does not inquire about wireless technology at the hearing aid evaluation and you don't feel that it is a necessary part of the sale, then don't mention it
- Before the hearing aid fitting, prepare the hearing aids to use whatever Bluetooth receiver you are planning to demonstrate, if necessary

Demonstrating

- At the hearing aid fitting, once the entire appointment is finished, you then tell the client that you have something you wish to demonstrate
- At this point, you can quickly let them hear the device using either a cell phone or an audio transmitter

Demonstrating

- Tell the client that when they come back for the follow-up, you will be happy to talk more about it and then send them on their way

Demonstrating

- Benefits of this technique
 - It doesn't increase the time necessary for the hearing aid evaluation or fitting
 - It allows the client to have a week or two at home without the technology causing confusion
 - This will then prevent technology problems from causing the patient to return everything

Demonstrating

Discussion Time

Geek Speak to the Max

Authentication: The process of establishing a secure connection between two Bluetooth devices.

Discoverable: When a Bluetooth enabled device is “discoverable,” other Bluetooth devices can detect, pair, or connect to it.

Discovery mode: When the device is made to be Discoverable.

Device Discovery: The process of searching for a Discoverable device.

Encryption: Method of encoding data to prevent others from being able to interpret the information.

Name Discovery: A procedure for retrieving the user-friendly name (the *Bluetooth* enabled device name) of a connectable device.

Passkey: The authentication key used to establish a link between devices.

Questions?



References and Resources

- The Official Bluetooth Technology Info Site
 - www.bluetooth.com
- Wikipedia – Bluetooth Reference
 - <http://en.wikipedia.org/wiki/Bluetooth>
- Blue Tomorrow
 - <http://www.bluetomorrow.com/>
- Bluetooth Gadget Guide
 - <http://gadget.bluetooth.com>
- GSM Arena – Cellphone Reviews
 - <http://www.gsmarena.com>
- Phone Scoop
 - <http://www.phonescoop.com>



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Thank you!

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PHONAK

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