

NORDIC tech TOUR

Bluetooth 4.1



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- Bluetooth 4.1 released 4th December 2013
- Common question from customers:
 - Does Bluetooth v4.1 impact my current (4.0) design?
- Answer: No
- Bluetooth has always been very focused on backward compatibility.
- This means that existing 4.0 and launching of a new 4.0 compliant product are still valid even if hosts appear stating 4.1 compliance
- Only situation that will force an 4.0 customer to upgrade to 4.1 is if that product depends on new features released in v4.1
- There are many other factors that mean 4.1 additions cannot be used in practice
 - Lack of OS support
 - Lack of additional features to make that feature usable

BT v4.0 – Errata/spec addendums

BT v4.1	What it enables
Integrate ESR's, CSA's etc.	<p>V4.0 launched at 2010 (at 3 years ago). V4.0 now has a rather long list of erratas and addendums, with agreed upon fixes! Integrating all these into the core spec document will be one of the major changes/improvements on v4.1</p> <p>NOTE: The solutions on the market today already include all these changes, so this is only to bring the core spec document in line with the products actually being made. Currently you have to check 7(!) different documents to get a feature right! Has NO impact on current products.</p>

BT v4.1 features

Bt v4.1 feature	Comments
32 bit UUID's	<p>128 bit UUID's didn't allow space for advertising proprietary services</p> <p>32 bit UUID's provide more space to enable users to advertise proprietary services.</p> <p>32 bit UUID's will be allocated and services must be made public</p>

BT v4.1 features

BT 4.1 Feature	Comments
Low duty cycle directed advertising	<p>Enables directed advertising with long intervals just like un-directed advertising already can in v4.0</p> <p>In BT 4.0, the directed advertising interval $\leq 3.75\text{ms}$, Thus, high current consumption in directed advertising.</p> <p>Enables low power directed advertising for re-connects. Most customers, except HID, uses un-directed today!</p> <p><u>However</u> Whilst a good feature for some app's e.g Sports watch, keyboard etc. It isn't allowed by iOS. iOS refreshes devices with new addresses every 15 mins for added security, so not of use at this moment</p>

BT v4.1 features

Bt v4.1 feature	What it enables
Connection oriented L2CAP channels	<p>Enables protocols to run in paralell with GATT/GAP and share the BLE link controller for as transport.</p> <p>Ex: object transfer Provide a basis for IPv6 (L2CAP would sit underneath and IP stack)</p> <p><u>However</u> iOS and Android do not support direct access to L2CAP in their OS currently so not of use at this moment</p>

BT v4.1 features

BT 4.1 Feature	Comments
New link layer topologies	<p>Removes limitations on network topologies, enabling repeaters and more advanced network topologies.</p> <p>Nordic (and most others) will most likely limit what you actually can do, otherwise it will become very complex for the end user.</p> <p>But YES, Application can be master and slave at the same time</p> <p><u>However</u></p> <p>This requires some accurate scheduling on both sides of the link to ensure connections function smoothly. This feature looks interesting but has many questions over implementation, timing etc.</p>

S110 BLE Peripheral SoftDevice Next Release

	First Alpha	Production Build	
SoftDevice Update over BLE (Minor revisions)	March 2014	May 2014	↓ Confirmed
Concurrent Peripheral/Broadcaster role	March 2014		
Concurrent multi-protocol BLE/2.4GHz RF support	March 2014		
Enhanced Privacy (Bluetooth 4.1)			
Low duty cycle directed advertising (Bluetooth 4.1)			
Single channel advertisement			
<u>Bluetooth 4.1 qualification</u>			Projected ↓
Reduced / flexible RAM usage			

Summary

- nRF51 series HW is capable of the v4.1 additions if necessary
- The current v4.0 SoftDevices S110, S120, S310 are all still valid for qualification and interoperability
- Most of the additions to v4.1 are realistically of no value because there is another blocker – OS support
- If another stack is identified as v4.1 compliant it will communicate with Nordic v4.0 stacks
- Unless:
 - A specific v4.1 feature is implemented and being used. Refer back to bullet point 3 above
- To qualify a stack as v 4.1:
 - Only one feature from v 4.1 needs to be included
 - No requirement to add all v 4.1 features from specification
- Nordic plan is to include relevant v4.1 features in upcoming stacks

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