

Bezdrátové senzory s přístupem systémem

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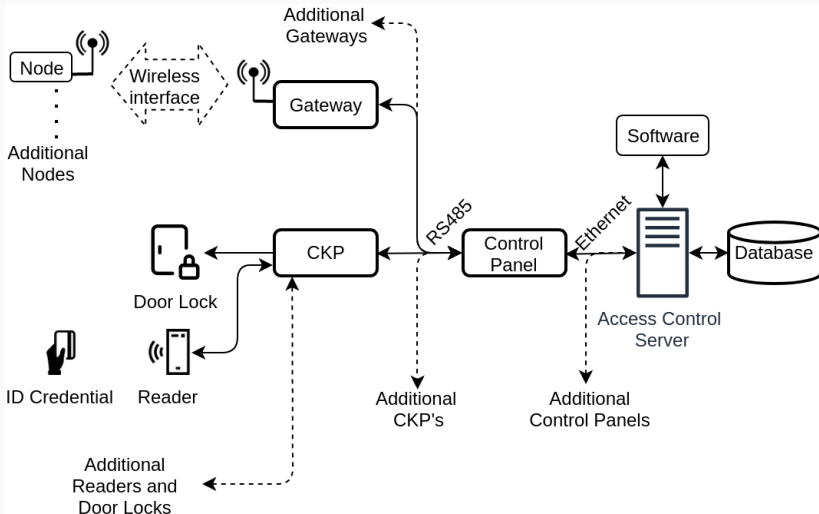
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Katedra Mikroelektroniky

- Projek ve firme IMA s.r.o.
- Spolufinancovano z dotace od SGS a.s.
- Vytvoren clanek pro odborny casopis:
 - Advances in Electrical and Electronic Engineering
 - <http://advances.utc.sk/index.php/AEEE>
 - Indexovn v databzi WoS a Scopus.

Integrate WSN do architektury pstupovho systemu



Poadavky:

- Nzk cena HW
- Jednoduch pripojen koncovch zazen tetch stran (Third party)
- Velk poet dostupnych koncovch zazen tetch stran na trhu
- Jednoduch implementace st
- Nzk spoteba energie koncovch zazen

WSN gateway - HW



Blokov diagram navren gatewaye senzorov st, Dragino LoRa Shield [1], RS485 transceiver [2], NUCLEO-Lo73RZ [3]

Rozdelen SW na nezvisl moduly:

- LoRa
- LoRaWAN_packet
- LoRa_sensors
- rs485_protocol
- usb
- eeprom

Doplňtkov knihovny:

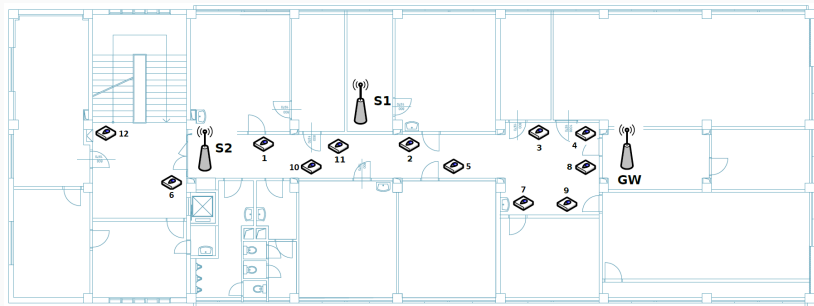
- buffer_ring
- ByteArray
- LinkedList_ByteArray
- aes (tiny-aes) [4]
- cmac (openpana) [5]

Testovná navrh gateway

Za bnm provozu V budov FEL, blok A4, 5. patro

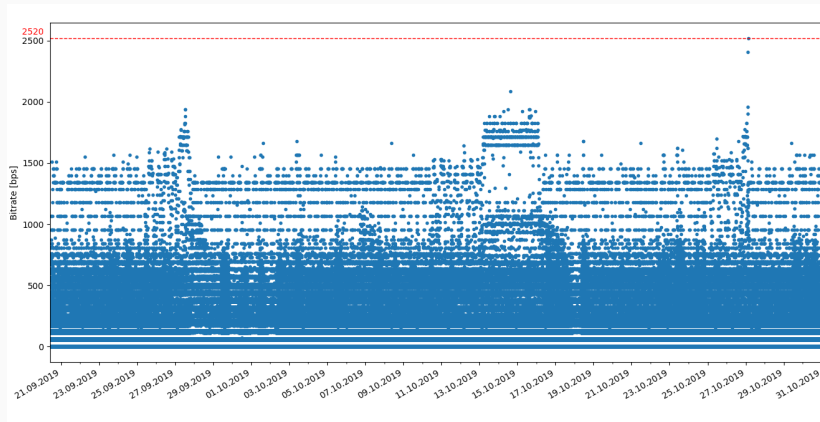
Pipojen zazen v testovan sti RS485

- 1 kontrolní panel
- 12 CKP zazen (přítok a odtok zmk)
- 1 gateway senzorová st + 2 senzory



Vpoet maximlnho potu koncovch zazen senzorov st

od 21. z do 31. jna

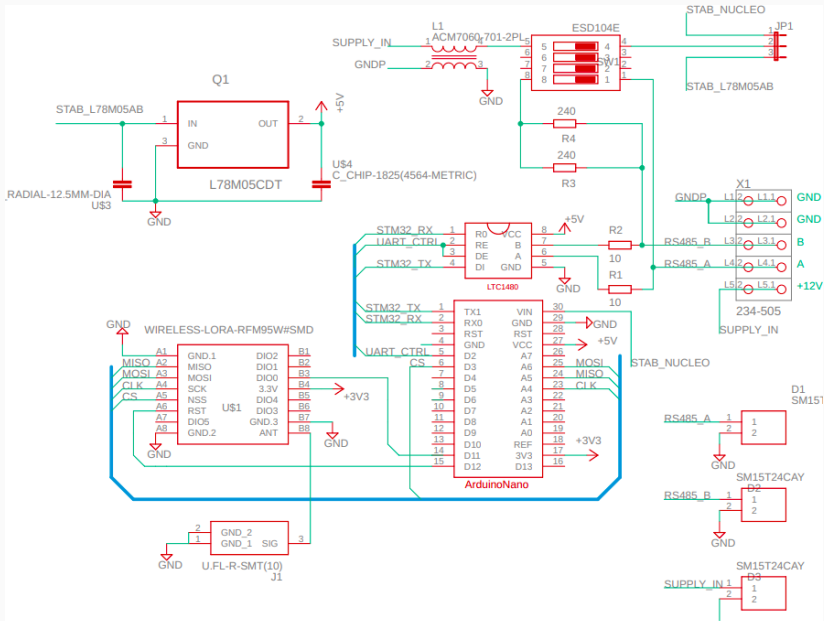


Vpoet maximlnho potu koncovch zazen senzorov st

$$S_{MAX} = \frac{\frac{v_{485}}{B}}{I_{MAX}} - R \quad (1)$$

RS485 rychlost penosu dat v_{485} [bps]	Rezerva R			
	0 %	10 %	20 %	30 %
1200	1	1	1	1
2400	3	3	3	2
4800	7	6	6	5
9600	15	13	12	10
19200	30	27	24	21
38400	60	54	48	42
57600	90	81	72	63
115200	180	162	144	126
230400	360	324	288	252
460800	720	648	576	504
921600	1440	1296	1152	1008

Vylepen prototypu navren gatewaye - schma



Vylepen prototypu navren gatewaye - foto



Dkuji za pozornost

Co znamen pojem orientace komunikace? Str. 11

Nekorektnost. Msto orientace komunikace m bt smr posln dat.




Zhodnote sprvnost odhadu max. potu pipo jench koncovch zazen z testovn provozu v sti RS 485. Kapitola 5.

Nekorektnost. Nejeden se o odhad, ale o vpoet.

Jak je chrffteno rozhran RS485 u vyvinut gatewaye ped peptm

Transil typu SM15T15CA s prraznm naptm 15 V, spojujc linky A a B ke GND.

References

-  Lora Shield. *Dragino* [online]. [cit. 2020-05-14]. Dostupn z: http://wiki.dragino.com/index.php?title=Lora_Shield
-  SparkFun Transceiver Breakout - RS-485. *Sparkfun* [online]. [cit. 2020-05-14]. Dostupn z: <https://www.sparkfun.com/products/10124>
-  NUCLEO-LO73RZ. *ST Microelectronics*. [online]. [cit. 2020-05-14]. Dostupn z: <https://www.st.com/en/evaluation-tools/nucleo-1073rz.html>



Bitdust / tiny-AES128-C: Small portable AES128 in C. *Github* [online]. [cit. 2020-05-14]. Dostupn z: <https://github.com/bitdust/tiny-AES128-C>



OpenPANA / openpana: OpenPANA it'll be soon a full functional free solution which implements the PANA protocol. By now, it's a multithreading implementation, supported by a framework, which allows multiple users to authenticate. *Github* [online]. [cit. 2020-05-14]. Dostupn z: <https://github.com/OpenPANA/openpana>