



# RAIN Communications Interface (RCI)

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# Working with UHF RFID systems

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- At the RAIN meeting in Graz 2016-02, the Developers workgroup discussion turned to how we are working with the various readers and the required infrastructure at implementations.
- And we found ... that it is not an easy situation and often time consuming.
- Why?



# Hurdles for more installations

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- *When integrators and end-users set up their RAIN RFID infrastructure, they*
  - may be faced with different readers for different purposes.
  - must work with different protocols ranging from simple to complex.
  - are looking at integrating with SDKs, APIs or plain protocol formats.
    - Subset: requirements for different programming languages, or the integrator in-house programming language is not supported.
  - find that newer RFID tag features are not supported by that reader or protocol.



# Who faces the issues?

- Integrators
  - Proliferation of different interfaces, APIs and SDKs is making the life for integrators harder.
- Reader Manufacturers
  - Additional effort for existing users wanting to add your readers to their program.
- Non-RFID experts
  - What is this all about??



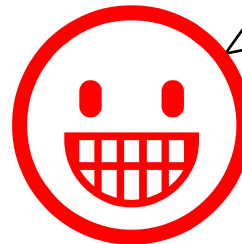
# RCI Guideline Targets

- New guideline for RAIN readers – *RAIN Communication Interface (RCI)*:
  - Simple to use, and simple to implement.
  - Use with different communication interfaces (Ethernet, RS-232, etc.).
  - Also run on low-resource platform (CPU, memory, communication bandwidth).
  - Easy to use in the current and future digital world, be part of Internet-of-Things.
  - Allow vendors to differentiate on reader intelligence, performance and services.



# RCI Data Format

- Uses human readable format (JSON based).
- Supported by many software tools and libraries.
- Minimal requirements for LEAN implementation.
- Allows for vendor specific extensions.



“This is what we want!”



# RAIN Communication Interface

## The “HTML” of RFID

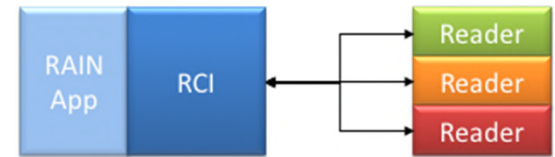
Increases interoperability of systems and solutions.

## Connecting with the IoT world

Easier to create connections with MQTT, OPC UA and more.

## Standards, standards, ...

RAIN inherently builds on the global standard from GS1 and ISO.



# RCI Data Interpretation

## Lots of bits in a tag

These are magic numbers unless you are an expert.

## Interpreting the bits

- ✓ Provides the data as human readable information.
- ✓ Avoids mistakes to start with
- ✓ Aids in immediate diagnostics
- ✓ Can be easily extended

## Compare with internet:

IP: 192.34.56.78

[www.this-is-my-site.qqq](http://www.this-is-my-site.qqq)

## Interpreting the bits

	nnnn	hhhh	ffff	cccccccc	cccc	cccc	cccc										
BIT #	05-04	03-01	00-00	80-00	07-06	05-04	03-01	00-00	70-70	77-77	71-70	77-70	71-70	63-05	05-05	06	
BIN	0 1 0 1 1 1 1 1 1 1	0 1 0 0 1 0 1 0 1 0	1 0 0 1 1 0 1 1 0 1 0 1 0 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1
HEX	30	10	03	CB													

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BIT #	11-10	03-01	00-00	70-70	67-66	65-64	63-61	60-60	59-59	57-57	55-55	53-53	51-51	49-49	47-47	45-45	43-43	41-41	39-39	
BIN	0 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	
HEX	4F	4B	03	00																

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BIT #	05-04	03-01	00-00	70-70	67-66	65-64	63-61	60-60	59-59	57-57	55-55	53-53	51-51	49-49	47-47	45-45	43-43	41-41	39-39	
BIN	0 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1	0 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	
HEX	00	00	00	00																

or

```
"sgtin":{"CompanyPrefix":061414141,  
"ItemRefAndIndicator":112345,  
"SerialNumber":400}
```





# RAIN Communication Interface

## Enable more RAIN features

Sensors

Security – passwords / crypto

## Expert Know-How

Isolate new users from the gritty-nitty of tag content and air protocols!

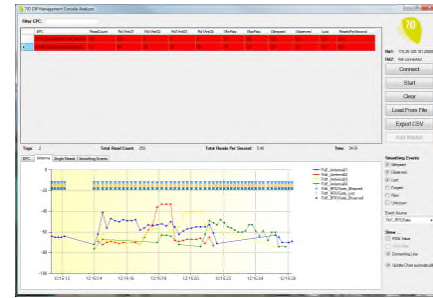
## Flooding

Encourage correct use, best practices and filtering when looking for *your* tags in a read-zone.



# Where are we?

- Version 1 released autumn 2018.
- Version 2 is pending approval from the board.
- Demonstrators and first compliant readers.
- Next steps being decided with the next release planned for later in 2019.
- **Will it do what you want?**



# Contribute!

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Join RAIN if you haven't already – and then join the Developers WG.

Monthly web-meetings and always interesting face-to-face meetings.

Don't hesitate – we are a nice bunch of people!

If you want to join the group send an email to [Caroline@RAINRFID.org](mailto:Caroline@RAINRFID.org)

For general questions contact:

Chair: [lthuring@logopak.de](mailto:lthuring@logopak.de)

Vice Chair: [apretorius@licensys.com](mailto:apretorius@licensys.com)

RAIN: [Steve@RAINRFID.org](mailto:Steve@RAINRFID.org)



Thank you!

