

# Coherence Check from PCal Injection Data with Locked status

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## >>> Contents

### **X-arm Locking status**

|— —> identified frame data in KISTI

|— —> selected datetime for analysis

### **Coherence Check**

|— —> method

|— —> result

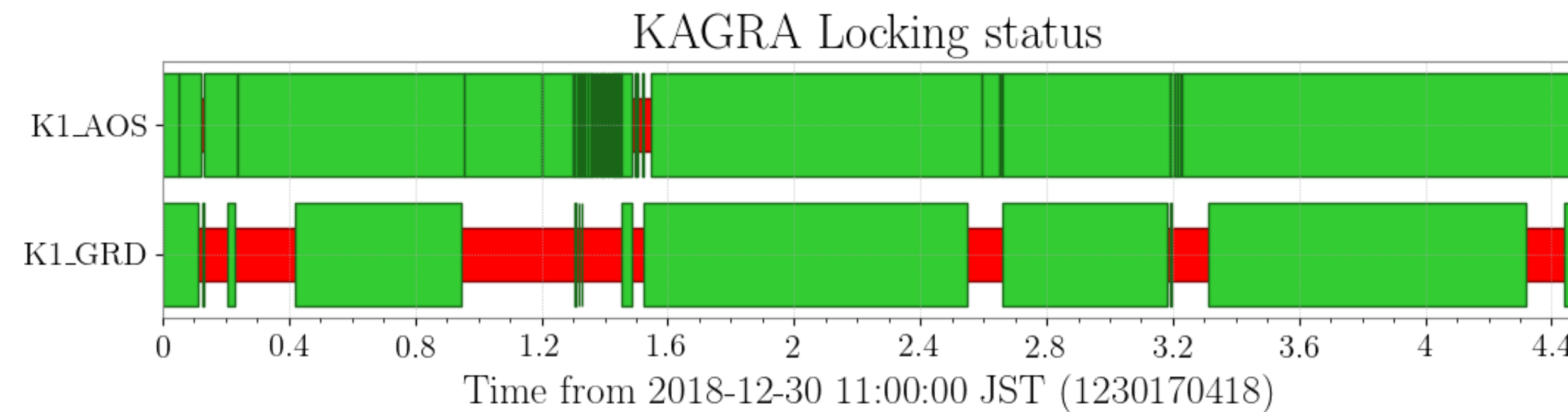
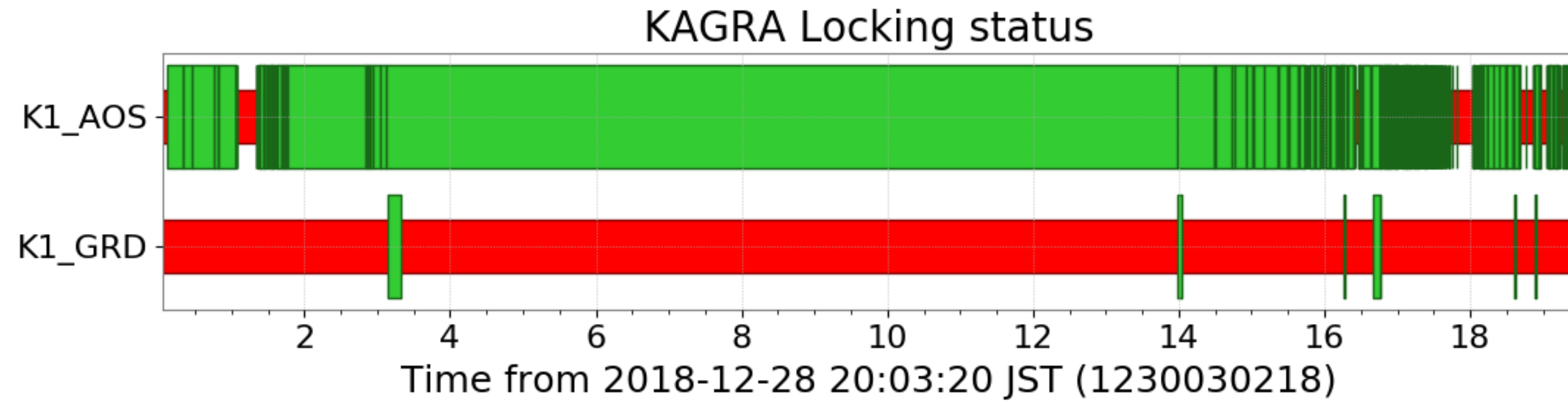
### **Trigger Analysis with hveto**

|— —> status

### **Others**

|— —> specific details required DetChar tools for K1 Summary Page

# X-arm Locking status



## ● Conditions

- K1:AOS-TMSX\_GR\_PD\_OUT\_DQ > 300
- K1:GRD-ALS\_PDHX\_STATE\_N > 900

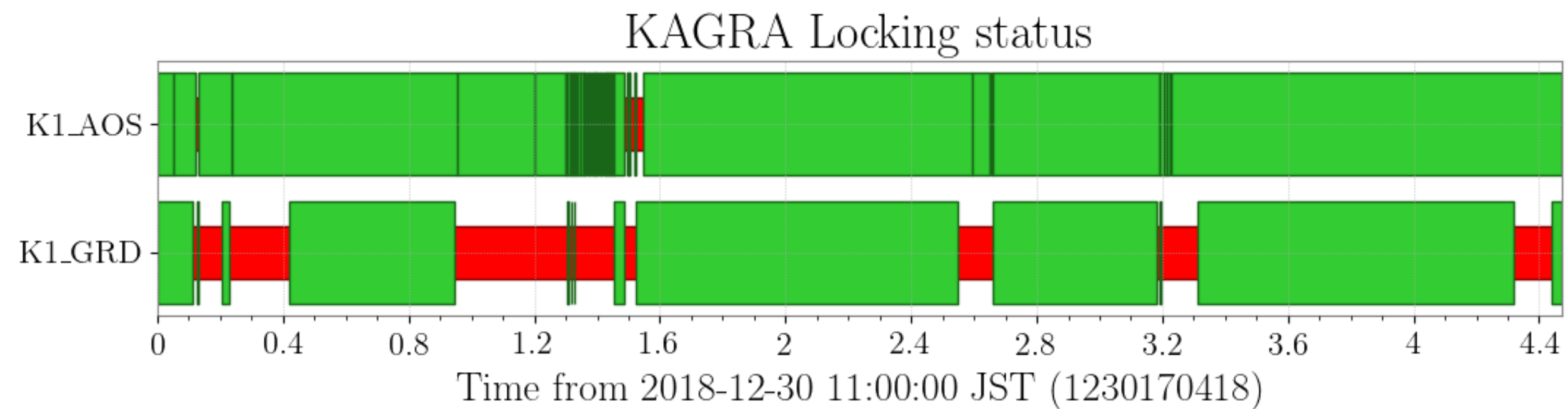
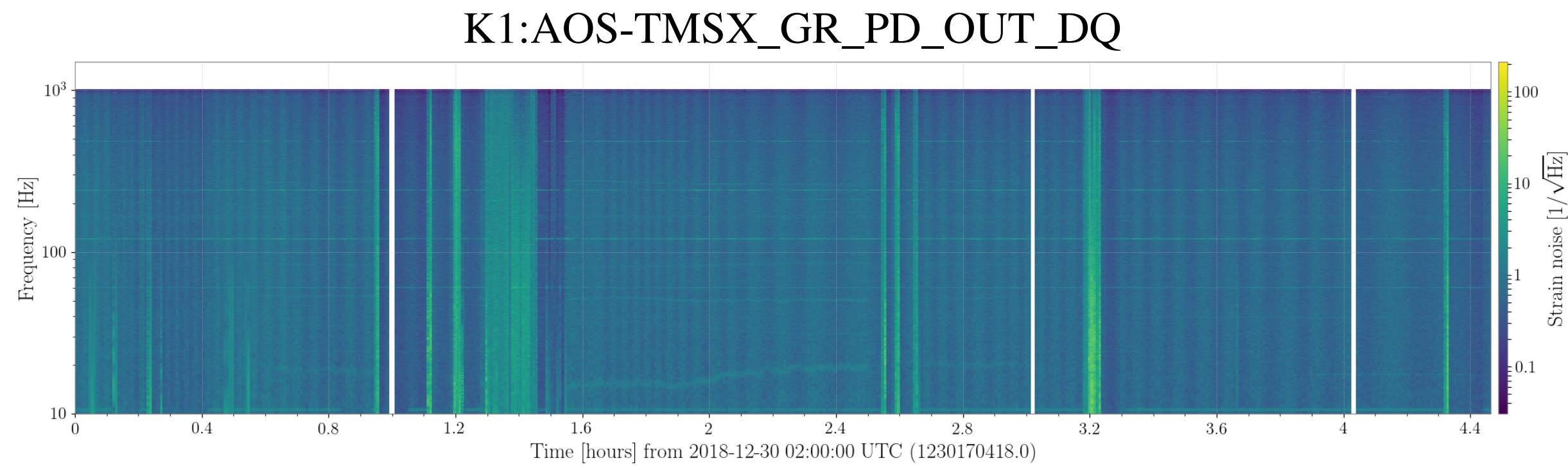
## ● In 12300

- GPS 1230000000 1230099968  
JST 11:39:42 28 Dec - 15:25:50 29 Dec 2018
- Unable to acquire locking state

## ● In 12301

- GPS 1230170418 1230186518  
JST 11:00~16:00 30 Dec 2018
- Able to acquire locking state in three sections

## >>> Selected datetime



#1

#2

#3

### ● In 12301

○ GPS 1230170418 1230186518  
JST 11:00~16:00 30 Dec 2018

#### ○ #1 section

- about 24 minute
- trigger data is secured

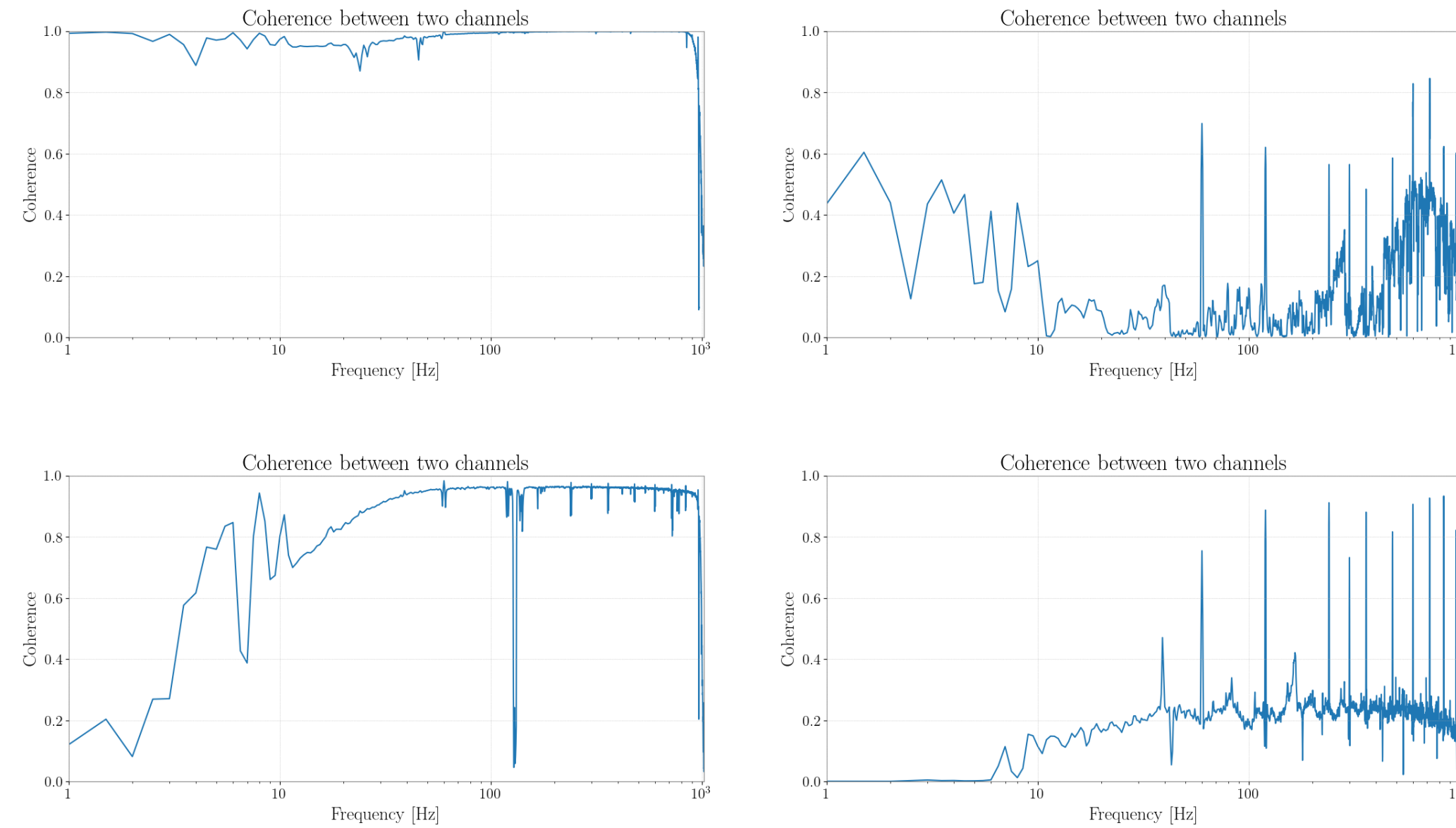
#### ○ #2 section

- about 55 minute
- trigger data is NOT secured

#### ○ #3 section

- about 59 minute
- trigger data is NOT secured

# Coherence Check



## ● Requirements

- Difficult to identify plots one by one
- A way to easily identify coherence

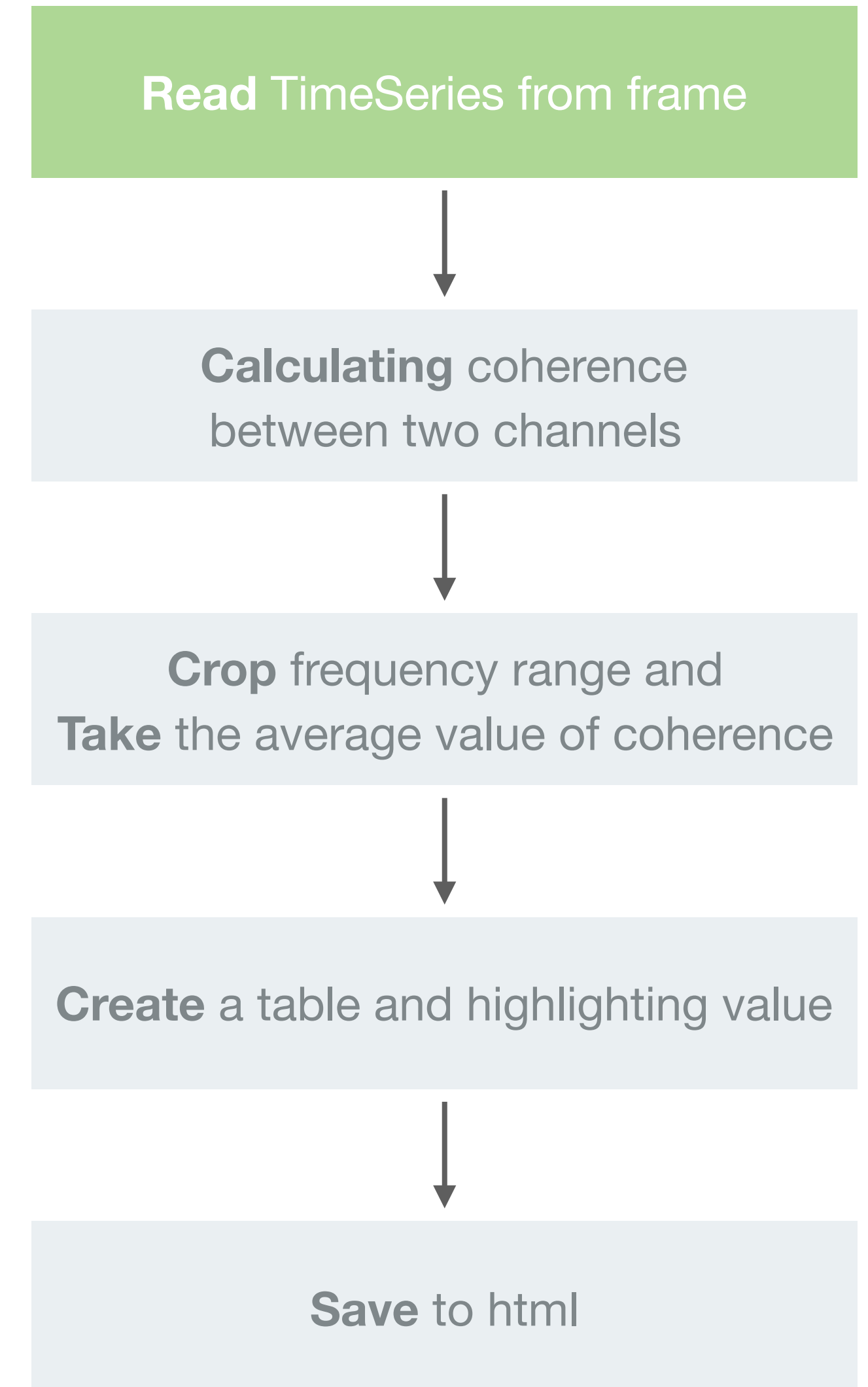
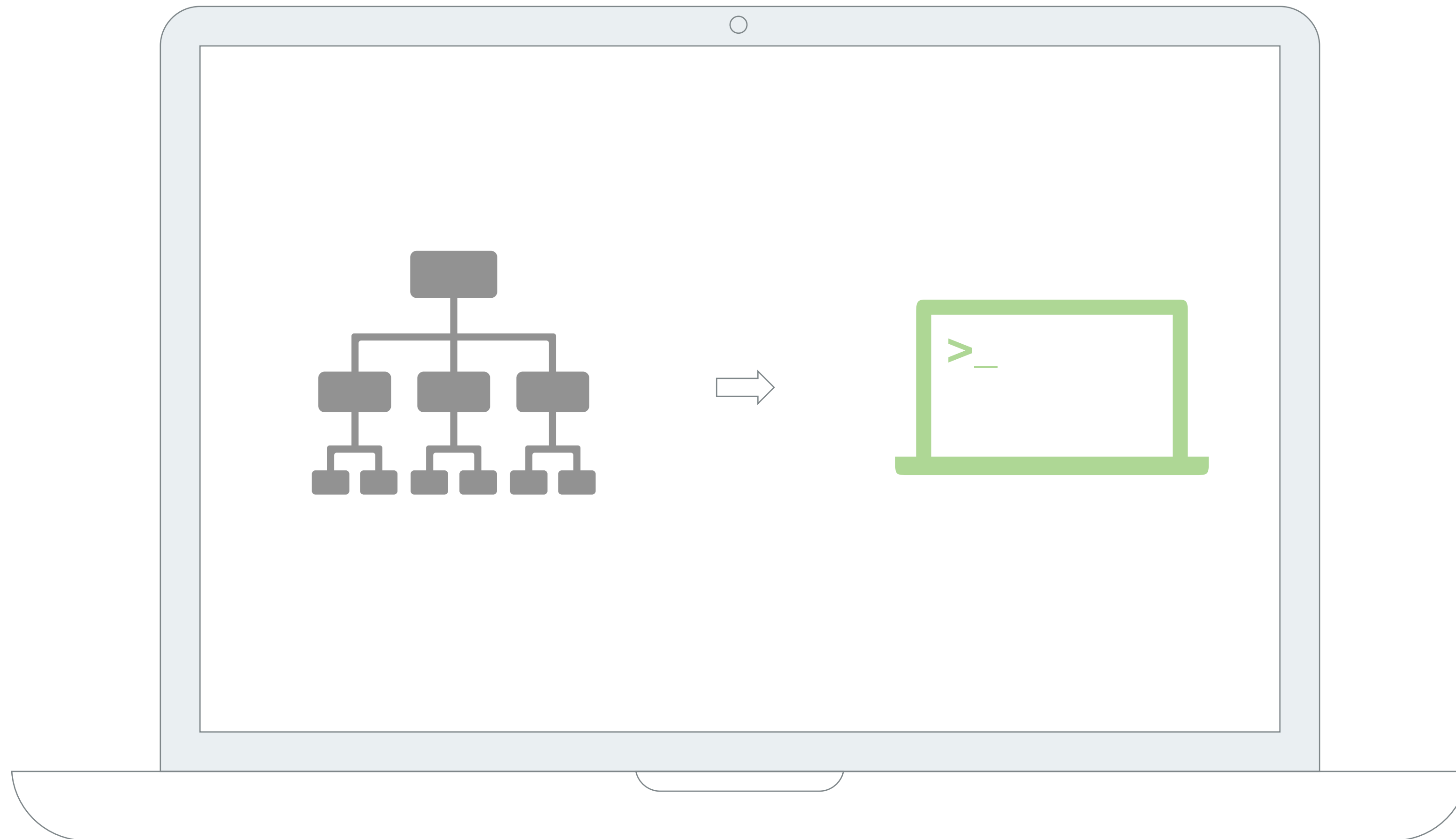
## ● Idea

- Take the average value of coherence
- and make html page

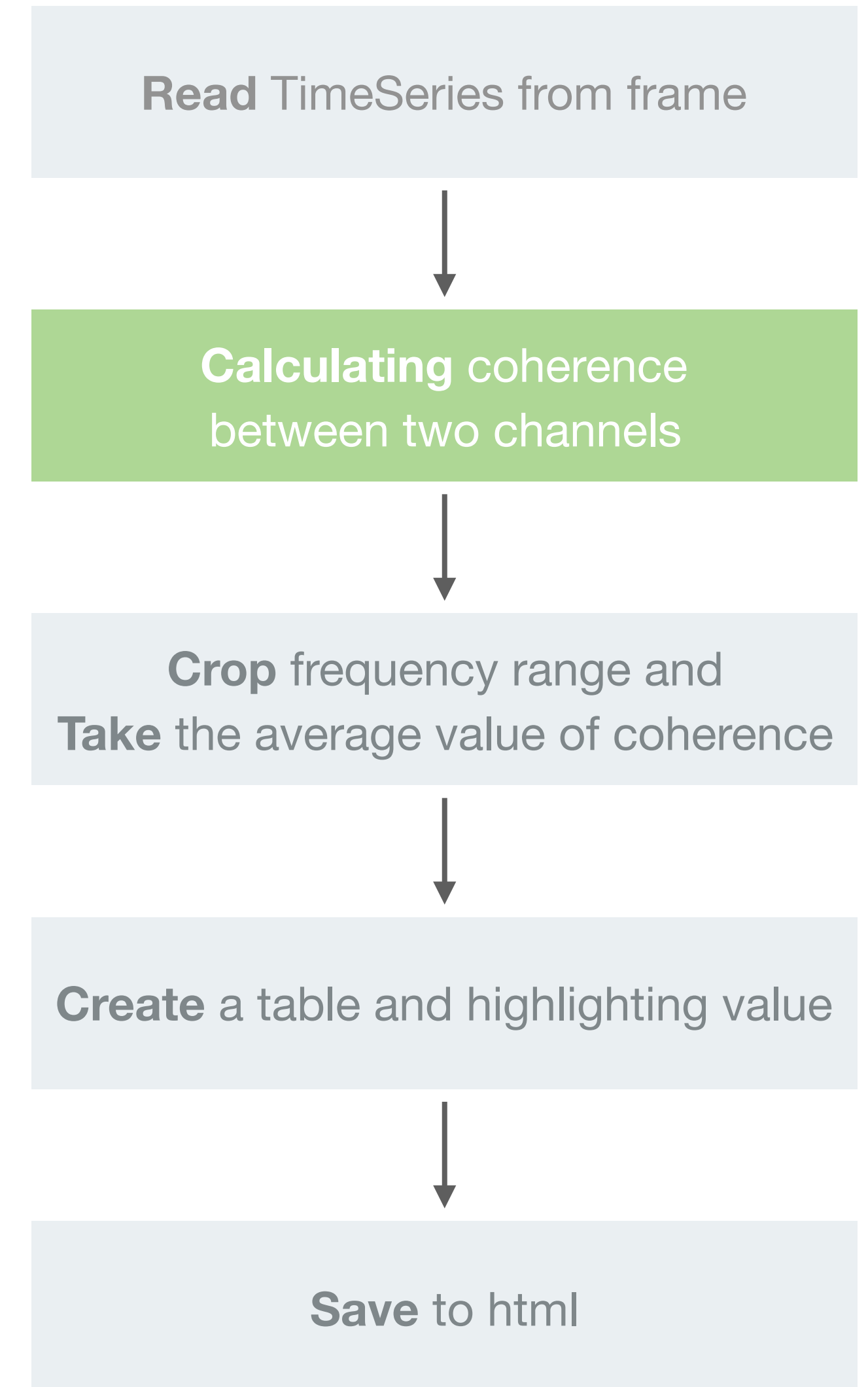
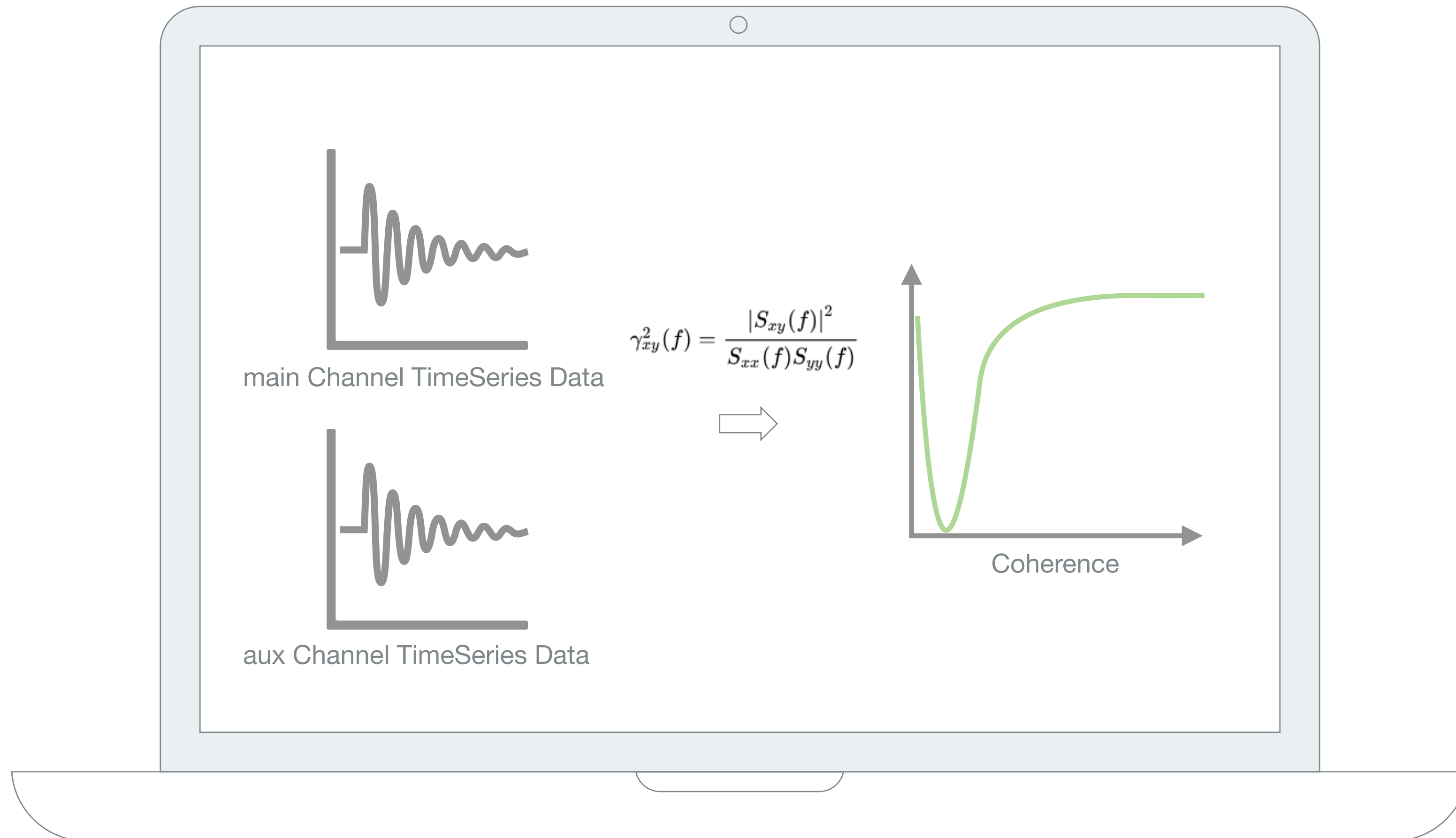
## ● Selected segments

- #1 and #3

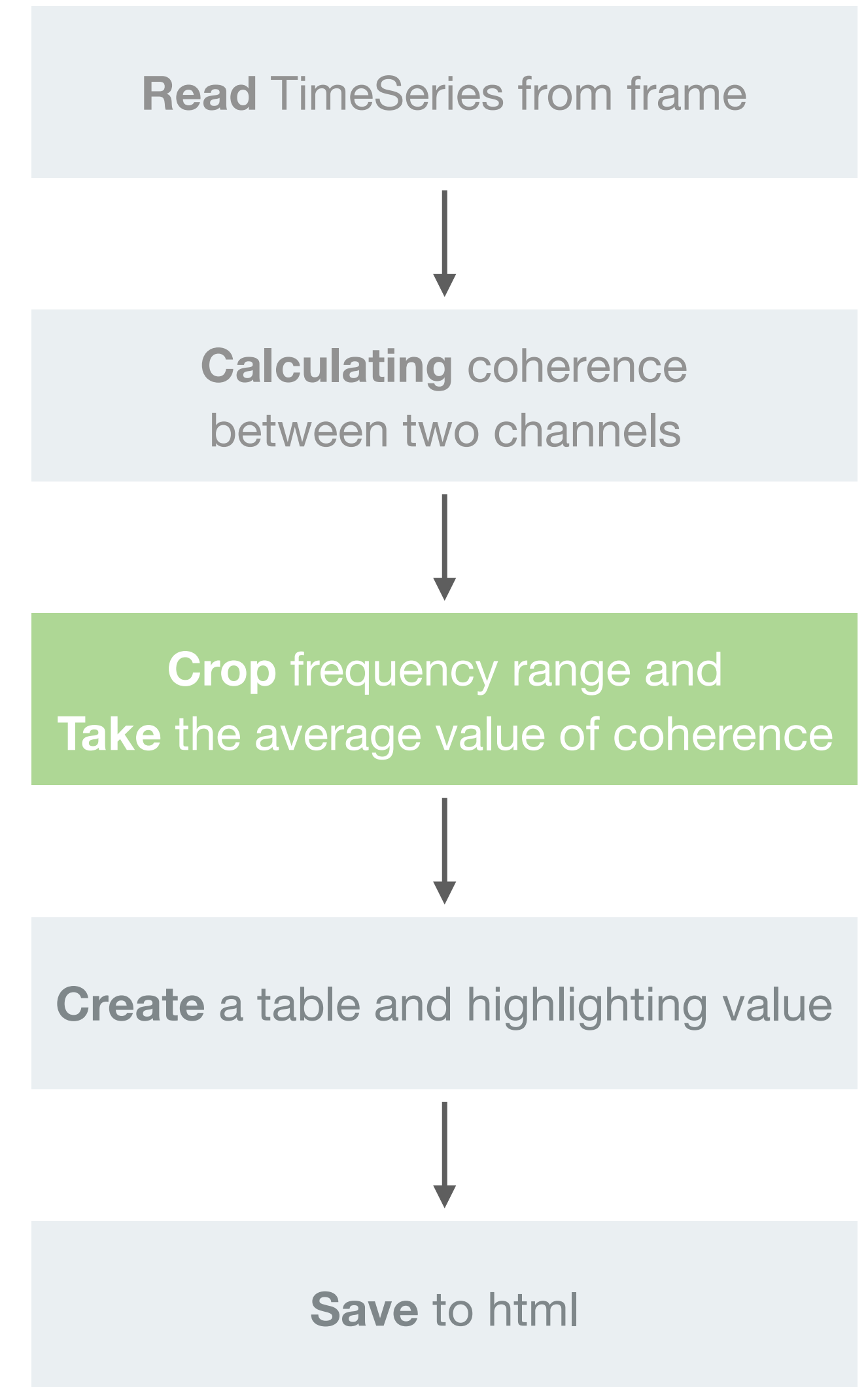
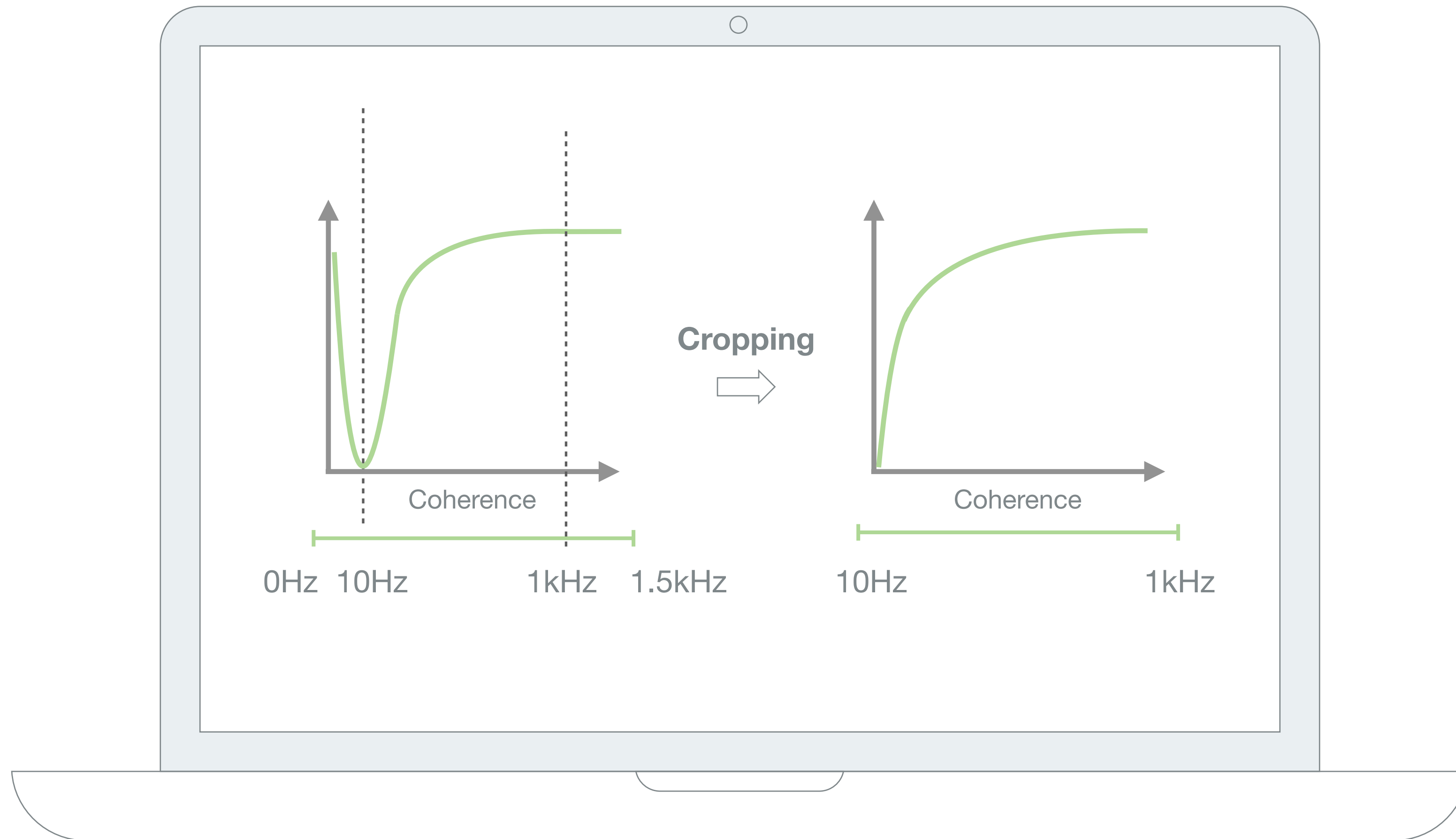
## >>> Coherence Check Method



## >>> Coherence Check Method

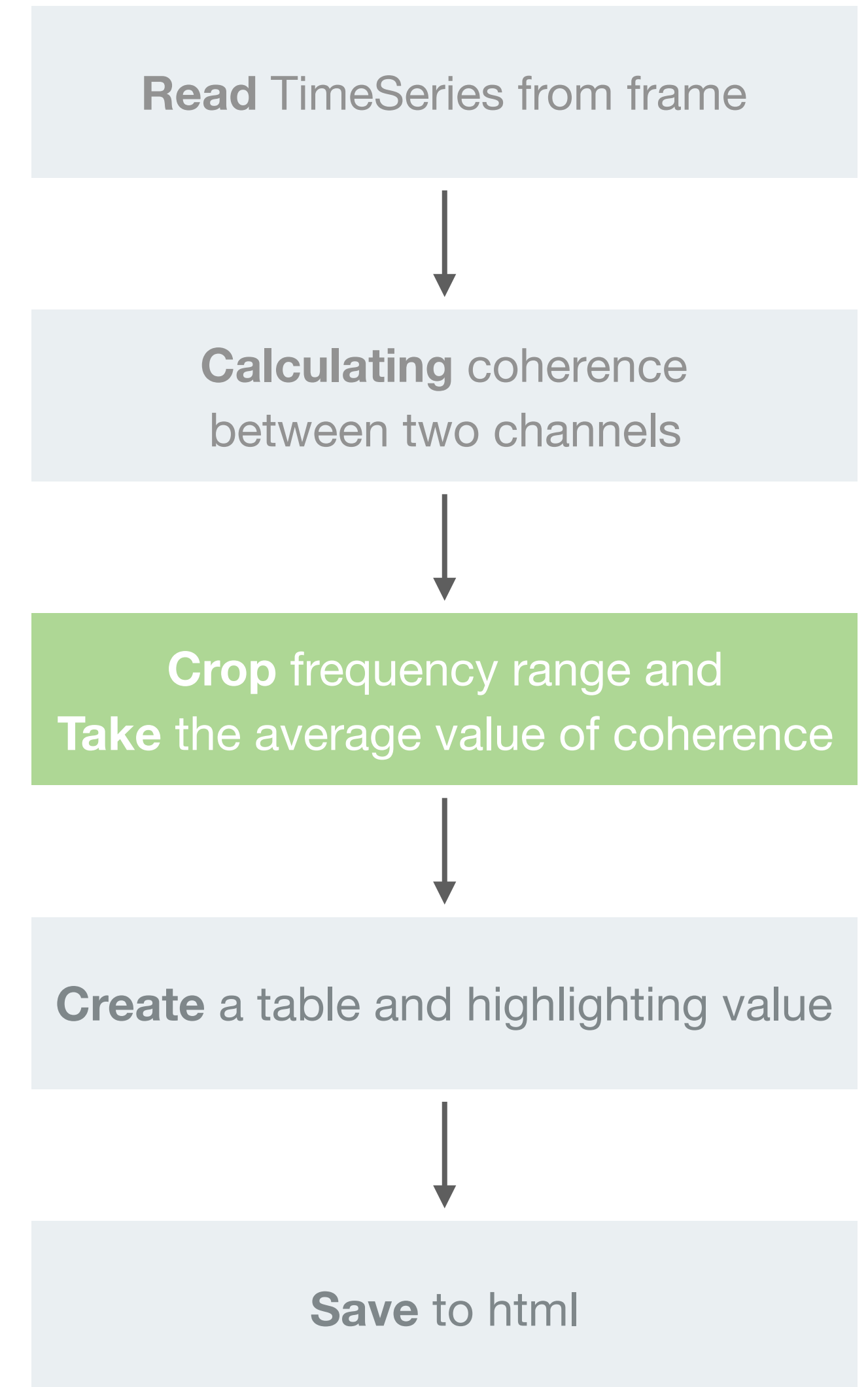
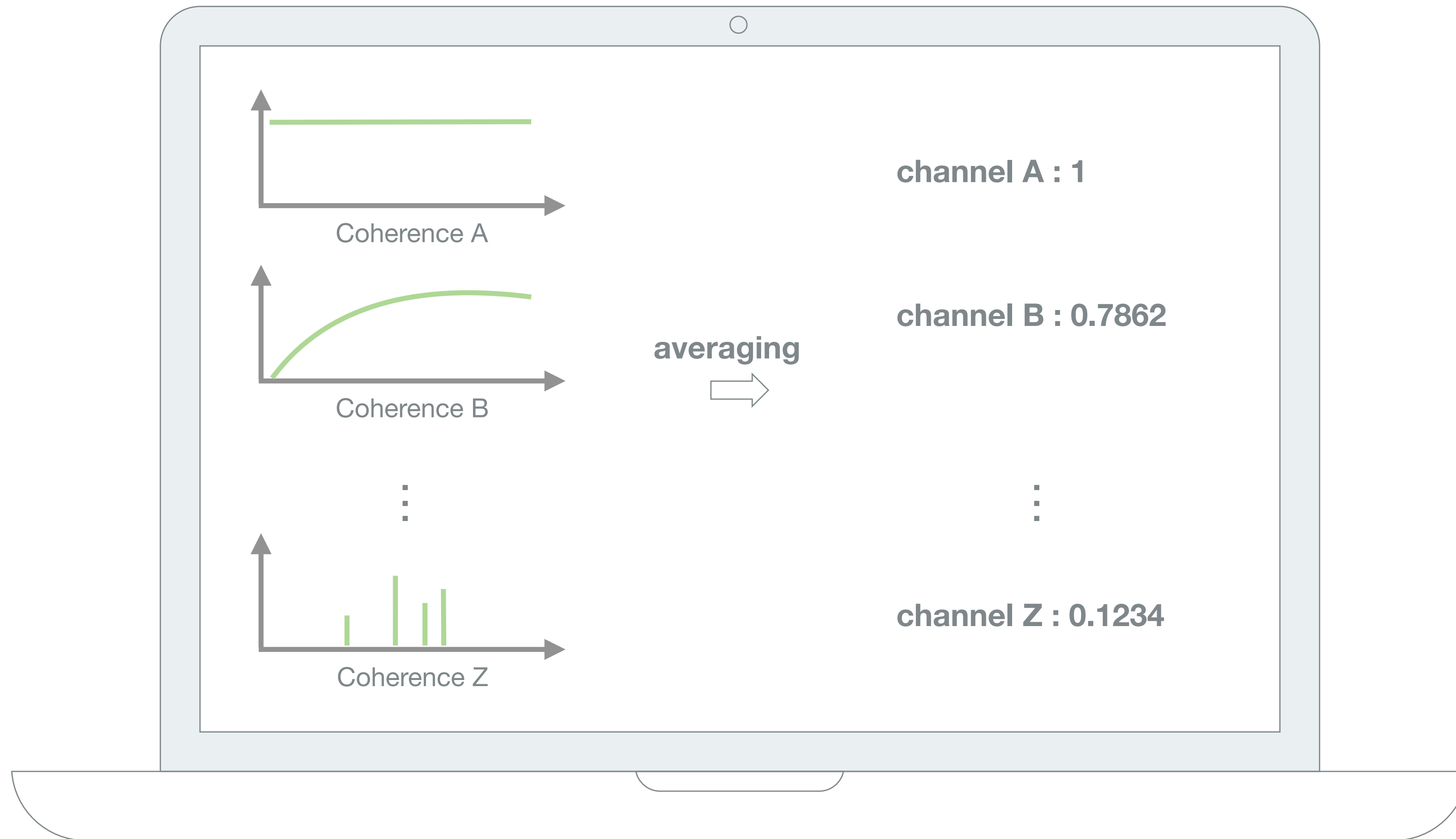


## >>> Coherence Check Method





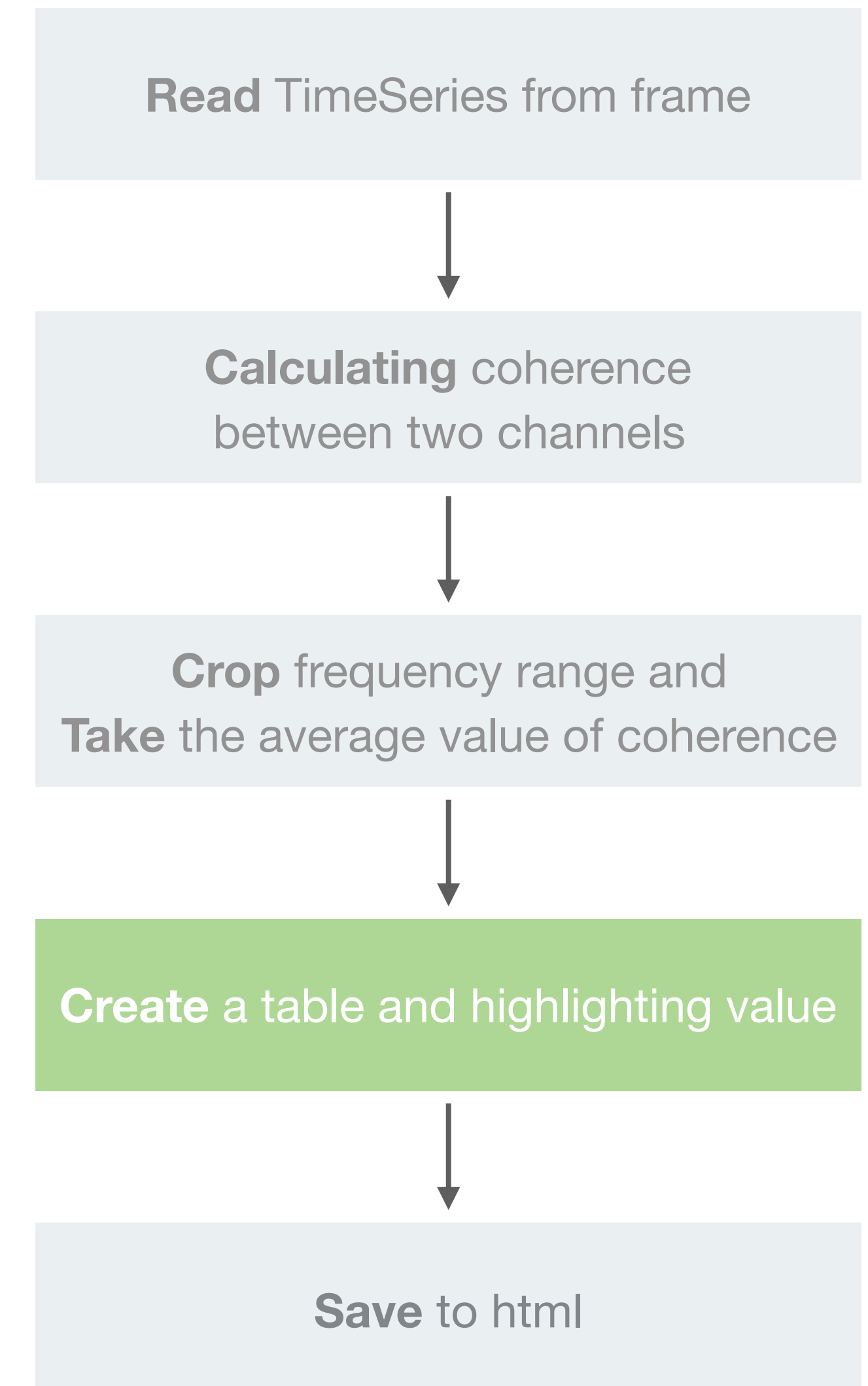
## >>> Coherence Check Method



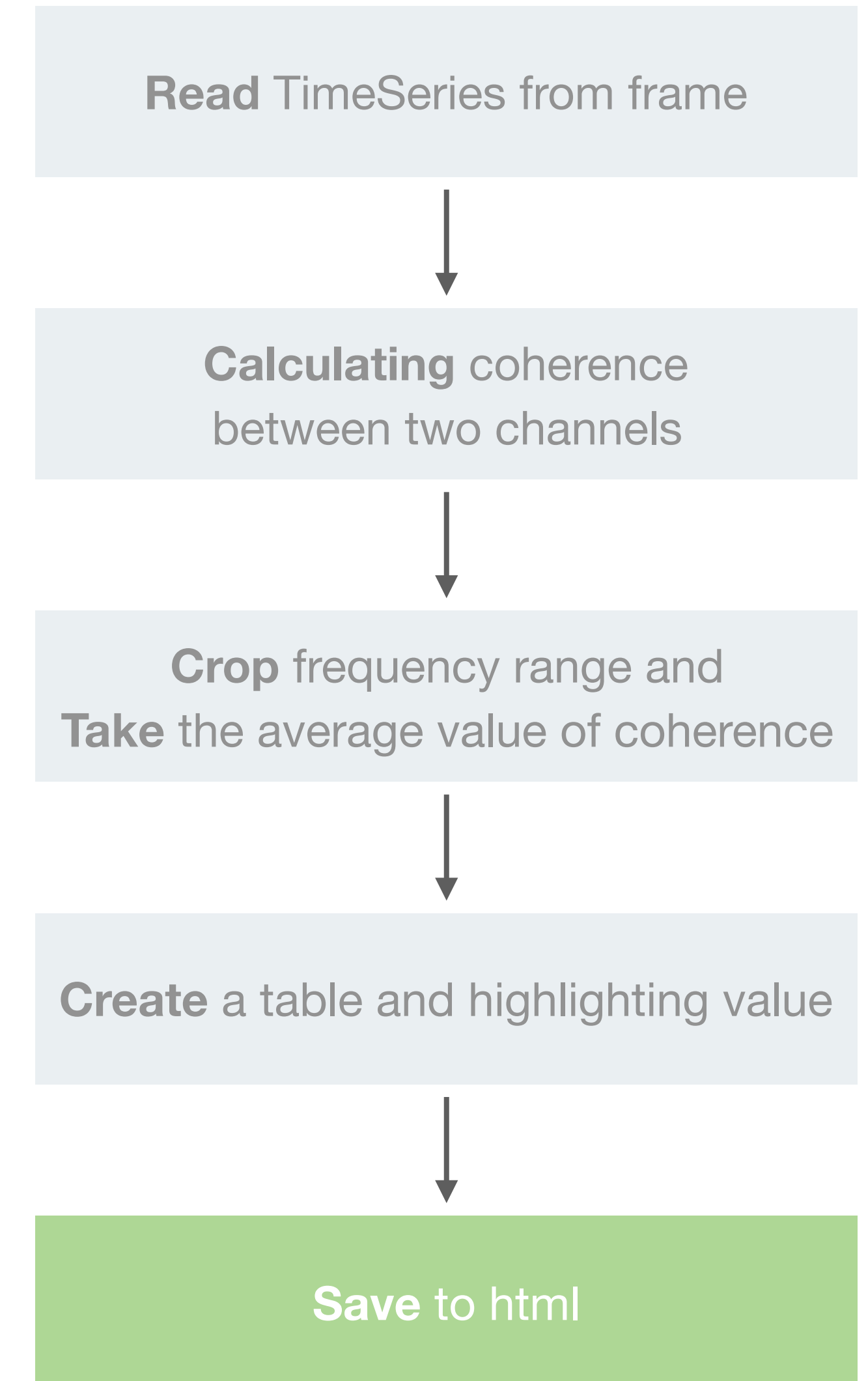
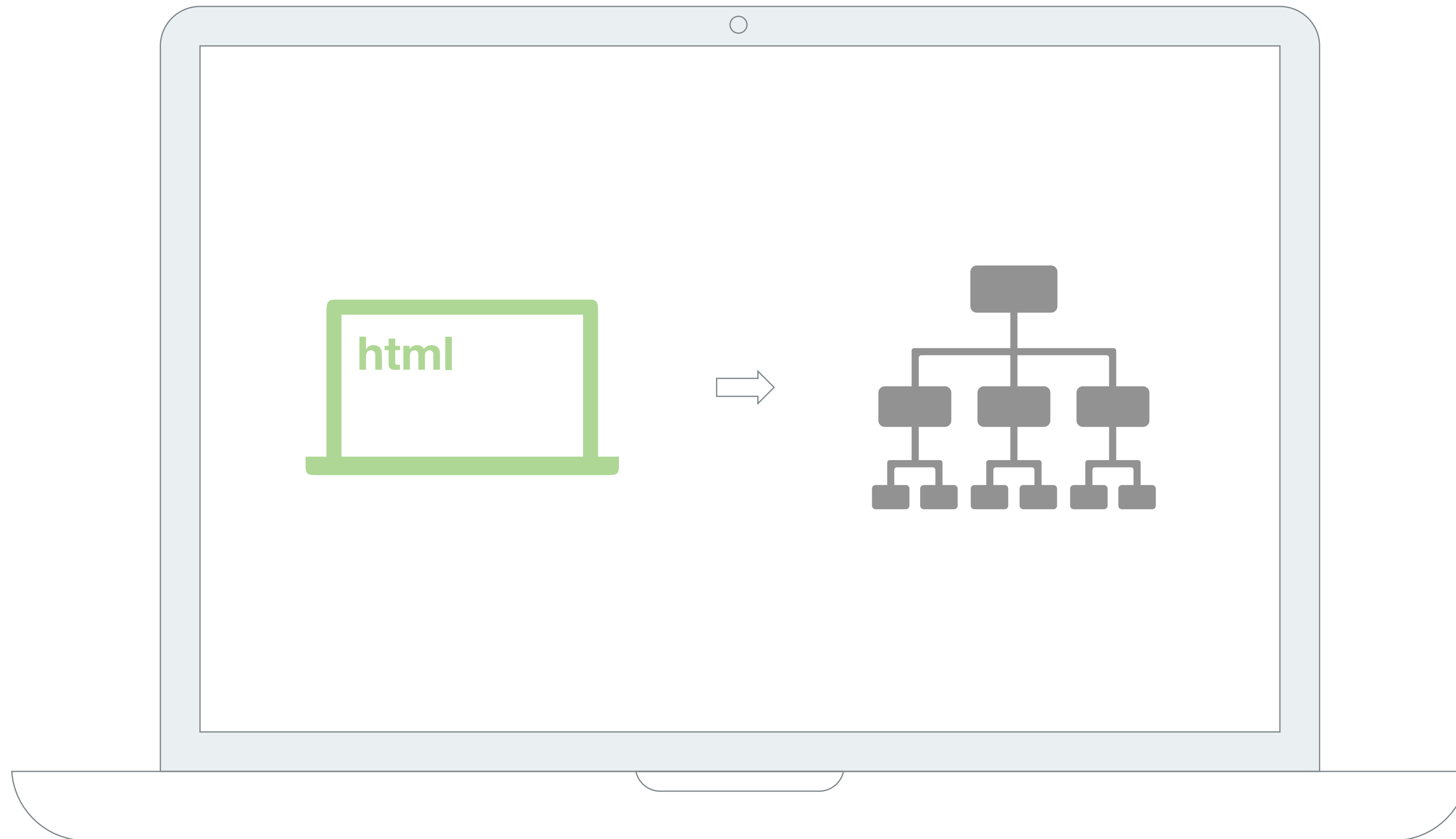
## >>> Coherence Check Method

ch1 : main channel 1  
ch2 : main channel 2  
ch3 : main channel 3

aux_channels	ch1	ch2	ch3
aux_channels A	0.976	0.002	0.001
aux_channels B	0.932	0.003	0.005
aux_channels C	0.001	0.123	0.234
aux_channels D	0.001	1	0.234
aux_channels E	0.123	1	0.896



## >>> Coherence Check Method



## >>> Coherence Check Results

Main Channel 1 (ch1) = K1:AOS-TMSX\_GR\_PD\_OUT\_DQ  
Main Channel 2 (ch2) = K1:AOS-TMSX\_IR\_PD\_OUT\_DQ  
Main Channel 3 (ch3) = K1:LSC-CARM\_SERVO\_SLOW\_DAQ\_OUT\_DQ

value = maen( coherence( 10Hz ) to coherence( 1kHz ) ) [ df = 0.1Hz ]

aux_channel	ch1	ch2	ch3
K1:ALS-DRIFTX_SERVO_IN2_DQ	0.0583	0.0337	0.0551
K1:ALS-DRIFTX_SERVO_OUT_DQ	0.0583	0.0337	0.0551
K1:ALS-DRIFTY_SERVO_IN2_DQ	nan	nan	nan
K1:ALS-DRIFTY_SERVO_OUT_DQ	nan	nan	nan
K1:ALS-GEN_MON_OUT_DQ	0.2212	0.0436	0.0337
K1:ALS-PDHX_FAST_DAQ_OUT_DQ	0.0037	0.0052	0.007
K1:ALS-PDHX_MIXER_DAQ_OUT_DQ	0.1776	0.0442	0.1101
K1:ALS-PDHX_SLOW_DAQ_OUT_DQ	0.0579	0.0339	0.0559

### ● Channels

#### ○ main channels :

K1:AOS-TMSX\_GR\_PD\_OUT\_DQ  
K1:AOS-TMSX\_IR\_PD\_OUT\_DQ  
K1:LSC-CARM\_SERVO\_SLOW\_DAQ\_OUT\_DQ

#### ○ aux channels :

sampling rate  $\geq$  2048Hz and DQ channels = 1,300

### ● #1 section

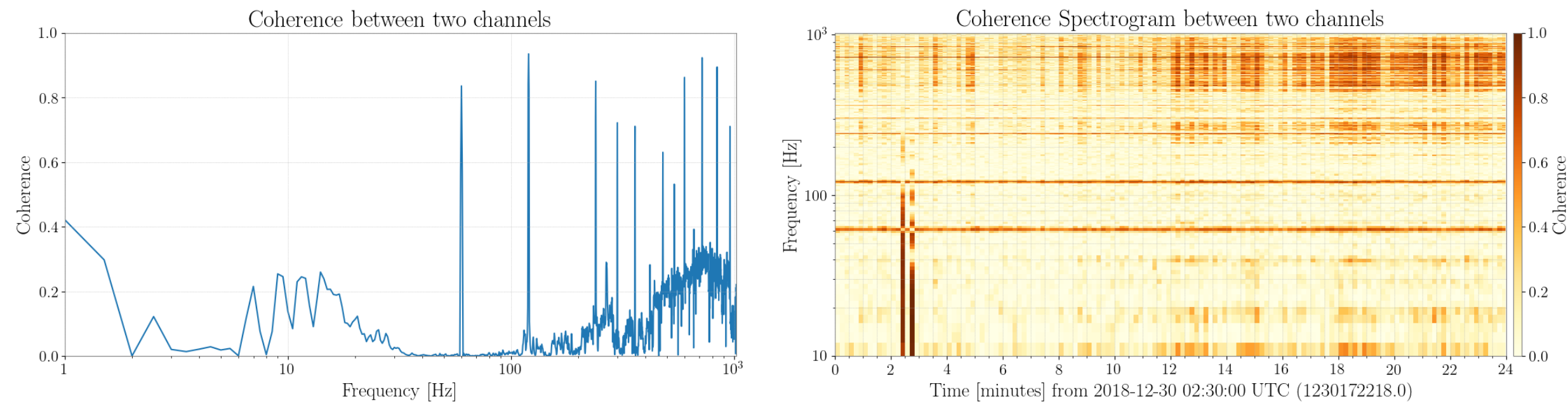
<http://10.68.10.130/~detchar/pj/test1.htm>

### ● #3 section

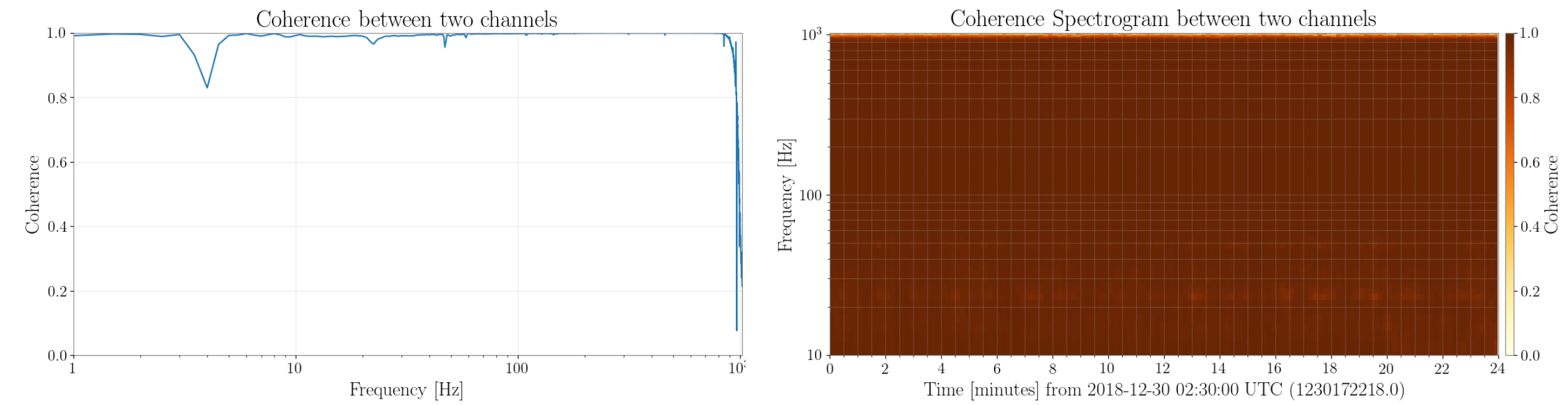
<http://10.68.10.130/~detchar/pj/test.htm>

# >>> Coherence Check Results

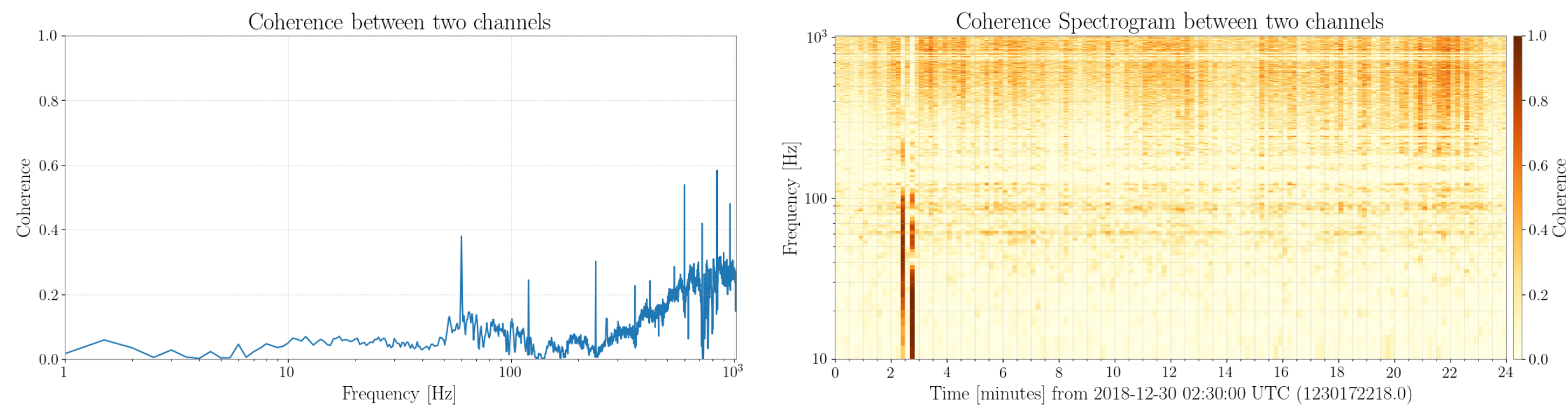
K1:ALS-GEN\_MON\_OUT\_DQ (value = 0.2212)



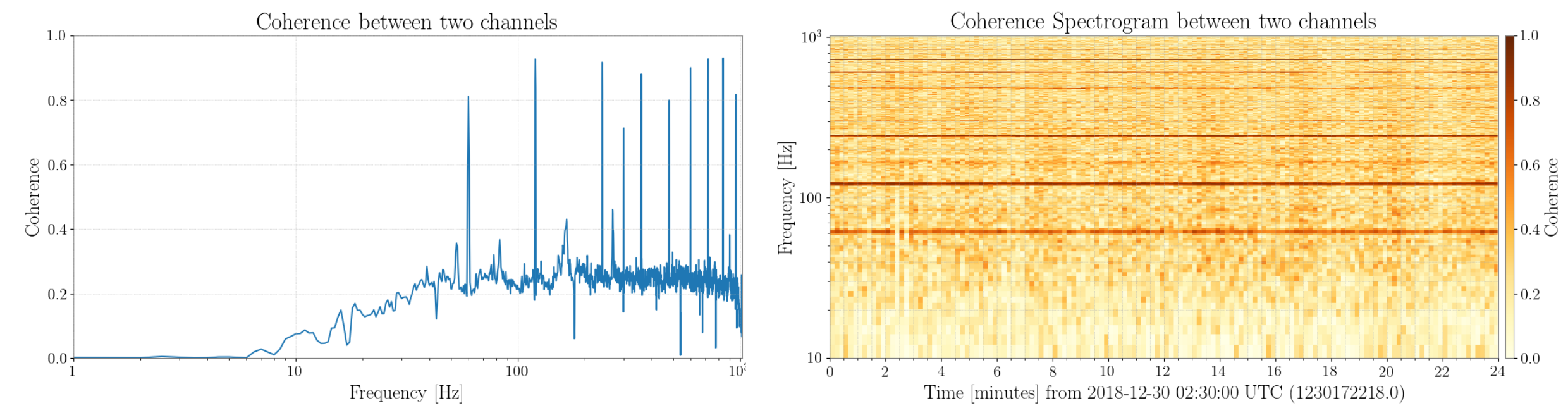
K1:ALS-XARM\_REFL\_OUT\_DQ (value = 0.9764)



K1:AOS-TMSX\_GR\_QPD2\_PIT\_OUT\_DQ (value = 0.2141)



K1:IMC-REFL\_QPDA2\_RF14\_Q\_YAW\_OUT\_DQ (value = 0.2482)



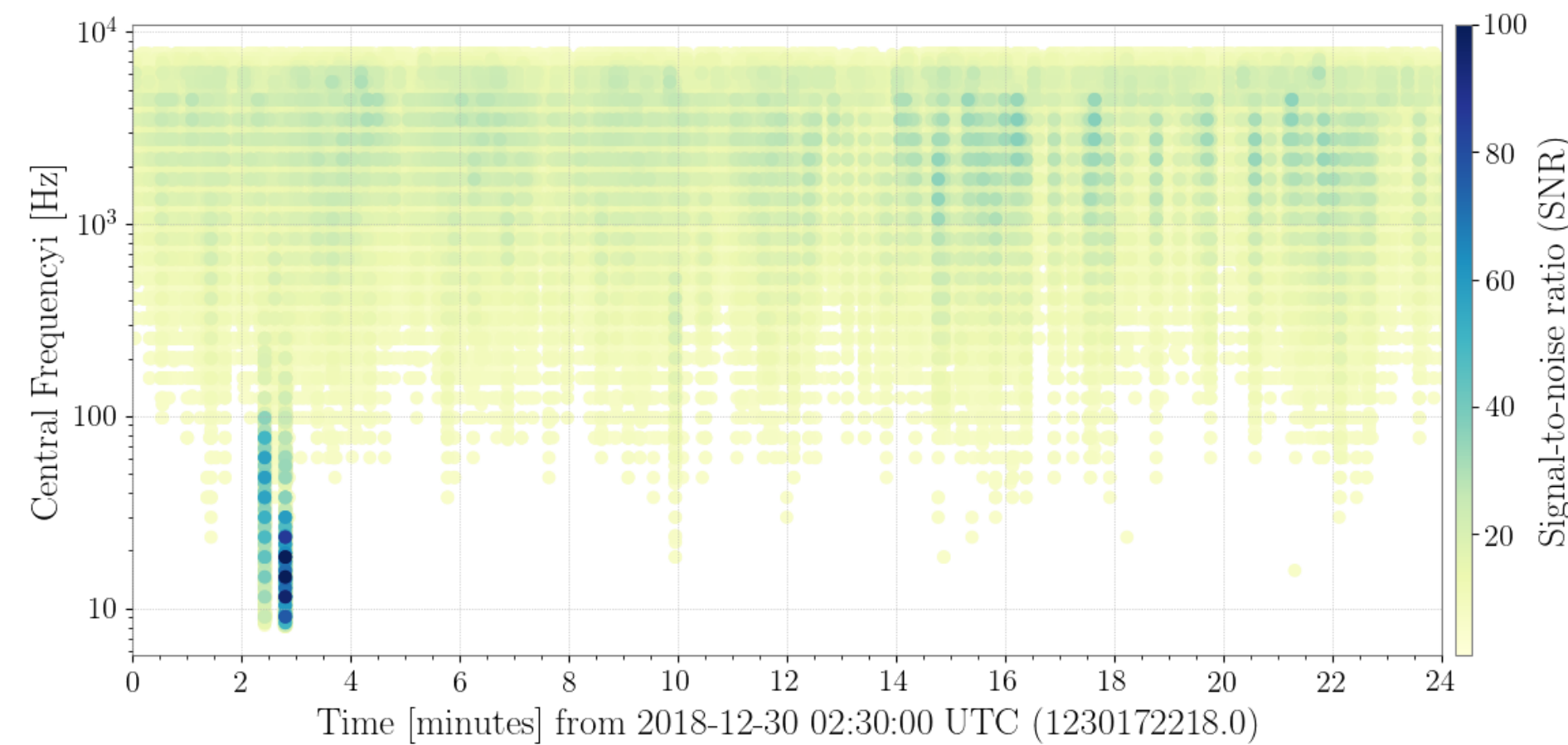
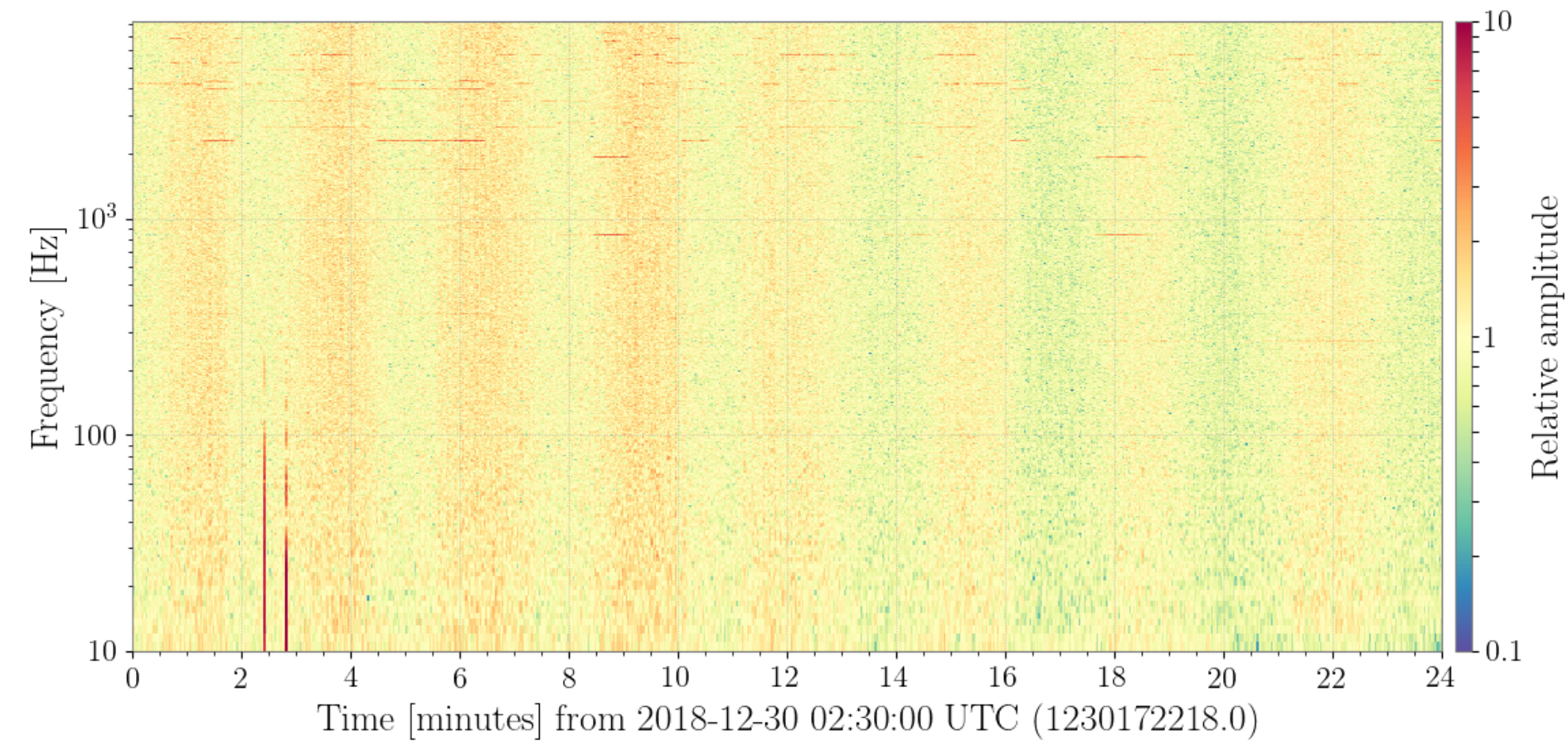
- selected segment : #1
- main channels : K1:AOS-TMSX\_GR\_PD\_OUT\_DQ

more details in #1 : [KAGRA Dropbox](#)  
 more details in #3 : [KAGRA Dropbox](#)



# Trigger Analysis with hveto

K1:ALS-XARM\_REFL\_OUT\_DQ



**#1-1**

## Requirements

- we want to know more information that was not revealed by coherence calculation
- we want to find channels that has a correlation with triggers

## Injection segment

- #1-1 : about 6 minute 30 second

## Selected channels

- main\_channels :
  - K1:AOS-TMSX\_GR\_PD\_OUT\_DQ
  - K1:AOS-TMSX\_IR\_PD\_OUT\_DQ
  - K1:LSC-CARM\_SERVO\_SLOW\_DAQ\_OUT\_DQ
- aux\_channels :
  - except coherence average value  $\leq 0.1$  or nan = 113

## >>> Trigger Analysis with h veto

Currently **unavailable** due to library errors in KISTI

I will try to make it available in **k1det1**

## >>> Others

- **Requested list for summary page tools**

[Glitch pipeline]

- Omicron
- Omega-scan
- KleineWelle

[Line pipeline]

- NoEMi
- FScan

- **Need more detailed information**

Whether we need to just install the software in k1sum0/1,  
Whether we need a tool to plot or,  
Whether something more is needed or not