# Invoice checksum calculation.

To uniquely identify each invoice a checksum is calculated at the invoice level. The logic for calculating checksum for invoice is given below.

1. Concatenate the attribute names and values for invoice headers into a checksum string.

The attributes are to be arranged in alphabetical order. Sort the item level details based on item number.

1. Sort the item level details based on item number. Append the item number and item level attribute names and values to the checksum string. (Please find the code snippet at reference section). The item level attributes are to be arranged alphabetically.
2. The final checksum is found by calculating the SHA-256 hash of the checksum string.

For e.g below shows sample concatenated string of for attached invoice :

## B2B invoice:



idt=08/01/2017,inum=1000,inv\_typ=R,itms=num=1,itm\_det=csamt=20756.0,iamt=5400.0,rt=12.0,txval=45000.0,num=2,itm\_det=csamt=20756.0,iamt=5400.0,rt=12.0,txval=45000.0,pos=37,rchrg=N,val=50000.0

## B2CL invoice:



idt=28/01/2017,inum=10001,itms=num=1,itm\_det=csamt=20756.0,iamt=17280.0,rt=5.0,txval=345600.0,val=250000.01

## B2CS:



iamt=25000.0,pos=31,rt=5.0,sply\_ty=INTER,txval=500000.0,typ=OE

## CreditDebitNote:

CDNR:



idt=08/01/2017,inum=1000,itms=num=1,itm\_det=camt=3000.0,iamt=6000.0,rt=12.0,samt=3000.0,txval=50000.0,nt\_dt=28/01/2017,nt\_num=90001,ntty=C,p\_gst=N,pos=37,rsn=Sales Return,val=22000.0

## CDNUR:



idt=05/01/2017,inum=10003,itms=num=1,itm\_det=iamt=12500.0,rt=5.0,txval=250000.0,nt\_dt=28/01/2017,nt\_num=90001,ntty=C,p\_gst=Y,pos=32,rsn=Sales Return,typ=B2CL,val=25000.0

## Nil:



inv=expt\_amt=233.0,ngsup\_amt=323.0,nil\_amt=323.0,sply\_ty=INTRAB2B,expt\_amt=3232.0,ngsup\_amt=233.0,nil\_amt=232.0,sply\_ty=INTRAB2C,expt\_amt=233.0,ngsup\_amt=233.0,nil\_amt=232.0,sply\_ty=INTRB2B,expt\_amt=23.0,ngsup\_amt=32.0,nil\_amt=2323.0,sply\_ty=INTRB2C

## Export invoice



idt=26/01/2017,inum=81510,itms=iamt=3939.4,rt=5.0,txval=78788.0,sbdt=28/01/2017,sbnum=184298,sbpcode=ASB995,val=995048.36

## AT



itms=ad\_amt=87515.0,csamt=6819.0,iamt=10501.8,rt=12.0,pos=32,sply\_ty=INTER

## TaxPaid



itms=ad\_amt=100.0,csamt=500.0,iamt=9400.0,rt=5.0,pos=05,sply\_ty=INTER

## HSN



data=csamt=500.0,desc=Goods Description,hsn\_sc=1009,iamt=14.52,num=1,qty=2.05,txval=10.23,uqc=kg,val=995048.36

## Doc\_Issue



doc\_det=doc\_num=1,docs=cancel=3,from=20,net\_issue=17,num=1,to=29,totnum=20

# R1 Summary Checksum calculation.

The checksum of GSTR1 summary payload is provided at different levels.

* Counter party wise checksum different sections of GSTR1 summary payload (if applicable)
* Section wise checksum for each sections of GSTR1 Summary payload.
* Complete GSTR1 Summary Payload Checksum.

## Counter Party Wise Checksum

Counter party wise checksum is applicable only for B2B, B2BA, CDN, CDNA, B2CL, B2CLA.

### For B2B, B2BA

The checksum calculation logic for counter party (Receiver GSTIN) wise summary is given below.

1. Fetch invoice number, invoice date, invoice checksum, provider and action taken by supplier of all section invoices for a particular Supplier GSTIN – Receiver GSTIN relationship for the current return period. The list consists of supplier uploaded and auto populated invoices.
2. For each counter party invoices are sorted in this order :
3. Receiver provided invoices will take precedence over supplier provided invoices.
4. The invoices in each provider group are sorted by financial year in ascending order.
5. The invoices with same provider and financial year are sorted by invoice number in ascending order.
6. Concatenate the checksum of sorted invoices and supplier action into a string. The valid acronyms of supplier action are given below.

|  |  |
| --- | --- |
| Supplier Action | Acronym |
| Accepted | A |
| Rejected | R |
| Modified | M |
| Keep Pending | P |
| Action not taken yet | N |

e.g. Concatenated String of counter party checksum = chksum(invoice1)+A+checksum(invoice2)+R

1. Calculate the SHA256 hash of the concatenated checksum string and use this as the counter party wise checksum.

### For CDN, CDNA

The checksum calculation logic for counter party (Receiver GSTIN) wise summary is given below.

1. Fetch note number, note date, note checksum, provider and action taken by supplier of all section invoices for a particular Supplier GSTIN – Receiver GSTIN relationship for the current return period. The list consists of supplier uploaded and auto populated notes.
2. For each counter party notes are sorted in this order :
3. Receiver provided notes will take precedence over supplier provided notes.
4. The notes in each provider group are sorted by financial year in ascending order.
5. The notes with same provider and financial year are sorted by invoice number in ascending order.
6. Concatenate the checksum of sorted notes and supplier action into a string. The valid acronyms of supplier action are given below.

|  |  |
| --- | --- |
| Supplier Action | Acronym |
| Accepted | A |
| Rejected | R |
| Modified | M |
| Keep Pending | P |
| Action not taken yet | N |

e.g. Concatenated String of counter party checksum = chksum(note1)+A+checksum(note2)+R

4) Calculate the SHA256 hash of the concatenated checksum string and use this as the counter party wise checksum.

### For B2CL, B2CLA

The checksum calculation logic for counter party (State code) wise summary is given below.

1. Fetch invoice number, invoice date , invoice checksum for all invoices of a Supplier- State code

Relationship for the current period.

1. For each state code , sort the invoices in the following order:
   1. Sort the invoices by financial year in ascending order.
   2. For invoices having same financial year, sort the invoices by invoice number in ascending order.
2. Concatenate the checksum of sorted invoices.
3. Calculate the SHA256 hash of concatenated checksum string and use this as the counter party wise checksum.

## Section Wise Checksum if counter party summary is applicable

For the sections such as B2B/B2BA/CDN/CDNA/B2CL/B2CLA, the summary checksum will be created based on the counter party checksum. The steps for calculating checksum is given below.

1. For the particular section, fetch all counter parties. If there is no counter party available, list will be empty.
2. Counter Party list is sorted in the alphabetical order.
3. Combine the checksum of all counter parties in the sorted order.
4. Calculate the SHA256 hash of the concatenated checksum string and use this as the counter party wise checksum.

## Section Wise Checksum if counter party summary is not applicable

For the sections such as EXP/EXPA/AT/ATA/TXPD/TXPDA/B2CS/B2CSA/NIL/HSN/TXPDOC/CDNUR/CDNURA, the counter party summary is not calculated. The steps for calculating checksum for these sections is given below.

1. Fetch all records of each sections.
2. For EXP/EXPA, the following steps are done for calculating checksum:
   1. Invoices are grouped into two groups, one group is Exports with pay and other is Exports without pay.
   2. In each group, sort the invoices by financial year first and then by invoice number.
   3. Concatenate checksums of all sorted invoices in each group and take SHA-256 hash of it and use it as the checksum of the group. Take SHA-256 hash of empty string if there are no invoices uploaded in the current period.
   4. Concatenate checksum of both the groups and take SHA-256 hash of it which is the checksum for the section.
3. For AT/ATA/TXPD/TXPDA, sort the records as follows:
   1. All Inter - state supplies takes precedence in the sorting order to the Intra – state supplies.
   2. For all records of same supplier – type, sort by pos. If a record exists without pos, that comes first in the sorted order compared to the record with the same supplier-type and has pos.

Concatenate checksum of sorted records and take SHA-256 Hash of it. Take SHA-256 hash of empty string if there are no invoices uploaded in the current period.

1. For B2CS/B2CSA records, the following steps are done for calculating checksum
   1. Group B2CS records with state code as the primary key.
   2. For each state code, sort the invoices in the following order:
      1. Outward supplies which are not made through e-commerce operator takes precedence to the supplies made through e-commerce operator.
      2. For supplies not made through e-commerce operator, sort the records by rate.
      3. For supplies made through e-commerce operator, sort the records first by rate and then e-commerce GSTIN.
   3. For each state code, concatenate checksum of the sorted records and take SHA-256 hash of it.
   4. Sort state code level checksums according to the state code in lexicographical order.
   5. Concatenate checksum of each state code and take SHA-256 Hash of it. Take SHA-256 hash of empty string if there are no invoices uploaded in the current period.
2. For NIL/HSN/TXPDOC, there is just a single record. The checksum of the single record is taken as the checksum of the section. Take SHA-256 hash of empty string if the section is not uploaded in the current period.
3. For CDNUR/CDNURA, sort the notes by financial year first and then by note number. Concatenate the checksum of the sorted invoices and take SHA-256 Hash of it. Take SHA-256 hash of empty string if there are no notes uploaded for the section in the current period.

## GSTR1 Summary payload checksum

The GSTR1 summary payload checksum is the combined checksum of all sections. The checksum is calculated based on the following process

1. Sections are sorted in the following order:
2. B2B
3. B2BA
4. B2CL
5. B2CLA
6. B2CS
7. B2CSA
8. CDN
9. CDNA
10. EXP
11. EXPA
12. AT
13. ATA
14. TXPD
15. TXPDA
16. HSN
17. NIL
18. TXPDOC
19. CDNUR
20. CDNURA
21. For each of the section from the sorted list fetch the section level checksum and concatenate them in to a string
22. SHA-256 hash of the string is the summary checksum

# Reference.

The code snippet for calculating SHA-256 hash is given below.



Sample pojo code for invoice and checksum calculation.

