ISO 24165
DIGITAL TOKEN IDENTIFIER
Product Advisory Committee
9 June 2022
Contents

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   • Data Quality Metrics
The purpose of this protocol is to remind attendees of DTIF meetings, including the Board, that all discussions at such meetings are subject to the application of EU, UK and other applicable national competition law ("Competition Law").

Individual attendees are responsible for observing the requirements of Competition Law and should make themselves familiar with their legal obligations and their own organization policies. DTIF is committed to compliance with Competition Law, so to ensure that all meetings remain in compliance with Competition Law, we advise that all attendees follow the guidance set out below.

- A meeting agenda will be circulated in advance of a meeting. Any objections to, or potential concerns about, the proposed agenda in relation to Competition Law compliance should be raised prior to the meeting if practicable
- Attendees must stick to the prepared agenda during the meeting and avoid discussion about other topics
- Attendees must not seek, discuss, communicate or exchange any commercially or other business sensitive information about their organization or relating to competitors (whether before, during or after meetings). This includes, for example, any non-public information relating to prices, costs, revenues, business plans/marketing activities, individual terms and conditions, risk appetite or any other information which is likely to reduce strategic uncertainty in the market (i.e. which might result in less intensive competition than would normally occur)
- Attendees must not reach any sort of agreement or understanding that is unlawful due to competition law (e.g. unlawful horizontal agreement, unlawful vertical agreement)
- The PAC Secretariat will take minutes of the meeting, and supply these to each attendee in due course.
- If the Chair considers that a discussion at the meeting may be inappropriate from a Competition Law perspective, he or she shall raise an objection and promptly bring that part of the discussion to an end. If another attendee is concerned about a discussion from a Competition Law perspective, he or she shall bring it to the attention of the Chair, who will promptly bring that part of the discussion to an end. If other attendees attempt to continue that discussion, the Chair shall bring the meeting to an end. Every attendee is allowed to immediately leave the meeting in such situations. All these situations must be properly recorded in the minutes
- The minutes of the meeting must subsequently be read and approved by the attendees. If any matter discussed is not recorded in the minutes, or is recorded incorrectly, any attendee may raise an objection in writing and request an amendment.
- Similar principles should be observed for any group email exchanges or other online group discussions operated by DTIF.

We remind attendees that breaching Competition Law has serious potential consequences for them as individuals and their organizations. Such consequences may include heavy fines, liability to pay compensation to affected individuals and businesses and, in certain cases, the imposition of criminal penalties, director disqualification orders and disciplinary action.
### 2.2 GOVERNANCE: Previous Minutes & Open Actions

#### Minutes from previous meeting:

#### Open Actions:

<table>
<thead>
<tr>
<th>Ref</th>
<th>Action</th>
<th>Owner</th>
<th>Target</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>091221-02</td>
<td>Update technical subcommittee on approach to listing &quot;co-native&quot; tokens</td>
<td>DEO</td>
<td>10-Feb</td>
<td>Propose to close</td>
</tr>
<tr>
<td>091221-03</td>
<td>Update Fully Validated Tokens &amp; Data Element Validation graphs to have the same scale for both data sets.</td>
<td>DEO</td>
<td>10-Feb</td>
<td>Propose to close</td>
</tr>
<tr>
<td>091221-04</td>
<td>Present the operational guide to the PAC, outlining the token validation process.</td>
<td>DEO</td>
<td>10-Feb</td>
<td>Open</td>
</tr>
<tr>
<td>091221-05</td>
<td>Add metric on usage of the registry, based on the information captured (e.g. number of queries, number of distinct users and their geography)</td>
<td>DEO</td>
<td>10-Feb</td>
<td>Propose to close</td>
</tr>
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## 2.3 GOVERNANCE: Technical Subcommittee Actions

<table>
<thead>
<tr>
<th>Ref</th>
<th>Action</th>
<th>Owner</th>
<th>Target</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>090921-03</td>
<td>Discuss the process of randomly generated DTI and DTIF’s discretion of changing it in the technical subcommittee</td>
<td>DEO</td>
<td>22-Nov</td>
<td>Tech Sub Committee</td>
</tr>
<tr>
<td>090921-04</td>
<td>Review work being done in ISO within TS 23258 (Blockchain and distributed ledger technologies — Taxonomy and Ontology)</td>
<td>DEO</td>
<td>22-Nov</td>
<td>Propose to close</td>
</tr>
<tr>
<td>090921-06</td>
<td>Review ISO 22739 (Blockchain and distributed ledger technologies — Vocabulary) and make sure that the definitions match with DTI standard</td>
<td>DEO</td>
<td>22-Nov</td>
<td>Propose to close</td>
</tr>
</tbody>
</table>
Status
3.1 STATUS: Registry update

- **March**
  - Added 26 new Auxiliary tokens
  - Revamped JSON Explorer: [https://dti-ije.dtif.org/](https://dti-ije.dtif.org/)

- **April**
  - Added 25 new Auxiliary tokens
  - Updated the look and feel on the DTIF website: [https://dtif.org/](https://dtif.org/)
  - Incorporated token icons into the registry: [https://dtif.org/token-registry-search/](https://dtif.org/token-registry-search/)

- **May**
  - Added 156 new Auxiliary tokens
    - Most were added based on a request from AFREUM - [https://afreum.com/ice/sites/app/index.cfm?sid=3&cid=62](https://afreum.com/ice/sites/app/index.cfm?sid=3&cid=62)
  - Created a PAC members only section on DTIF website
3.2 DATA QUALITY METRICS: Status Report

- As of May 2022, the DTI registry contains 496 unique tokens.
  - 434 Auxiliary token
  - 49 Blockchains with native token
  - 6 Functionally Fungible Group of Digital Tokens
  - 5 Other ledgers with native token
  - 2 Blockchains without native token
  - 0 Other ledgers without native token

- There have been 0 requests for amendments raised

- There have been 0 disputes
### 3.3 DATA REPORTS: Fully Validated Tokens

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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>114</td>
<td>121</td>
<td>122</td>
<td>122</td>
<td>222</td>
<td>285</td>
<td>311</td>
<td>340</td>
<td>496</td>
</tr>
<tr>
<td><strong>Unvalidated</strong></td>
<td>48</td>
<td>37</td>
<td>37</td>
<td>37</td>
<td>32</td>
<td>31</td>
<td>31</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td><strong>% Validated</strong></td>
<td>57.89%</td>
<td>69.42%</td>
<td>69.67%</td>
<td>69.67%</td>
<td>85.59%</td>
<td>89.12%</td>
<td>90.03%</td>
<td>90.88%</td>
<td>93.75%</td>
</tr>
</tbody>
</table>
3.4 STATUS: Next Steps – Q2/Q3

**Technical deliverables**
- Individual record JSON downloads
- Rest-API for token download
- Outstanding data verification
- Enhancements to the registry search

**Engagements**
- Continue engagement with ESMA (next call scheduled on 14/06)
- Commence work with ISO on standard enhancements
- Publish recommendations and next steps from ANNA and ITSA Task Forces
- Establish TAC (Technology Advisory Committee)
ESMA Call for Evidence on DLT
Digital Token Identifier Status – May 2022

1. ISO 24165 DTI Standard was published in September 2021.

2. In September 2021 DTIF went live with the DTI service.

3. Core governance, including Product Advisory Committee, was established August 2021

Current status:
• Service is live and issuing DTIs
• ISIN attribute is part of the DTI record and actively populated where the ISIN is known
In traditional markets, ISIN and MIC codes identify the what and where of a transaction.

In DLT markets, a DLT financial instrument may be issued on multiple DLTs, traded or settled on multiple DLT Market Infrastructures.

In the general case, the specific DLT where a DLT financial instrument was issued, traded or settled will not be derivable from existing data points.

If authorities wish to identify the DLT where a token was issued or where a transaction took place, then the DTI can provide this data point.

Subsequent slides explain how identifying the DLT enables the monitoring of DLT-specific risks associated with the issuing, trading and settlement of DLT financial instruments.
DLT-specific Risks - Overview

The 2017 BIS CPMI report on Distributed ledger technology in payment, clearing and settlement identified the following DLT-specific risks:

• Operational and security risks
• Settlement issues
• Legal risks
• Governance
• Data management and protection

Each DLT has a different combination of these risks. Different asset issuers may issue their tokens on different DLTs, resulting in stakeholders needing to understand the DLT-specific risks associated with each token.

The DTI provides the link between the DLT financial instrument and the DLT, in order to enable market participants and regulators to understand and monitor these risk for each DLT financial instrument.
DLT-specific Risks – Terra Use-case

A recent event on the Terra DLT (DTI=W0HBX7RC4) highlighted many of the risks identified by the BIS report:

- On 11 May 2022, Luna, a native token on Terra DLT, dropped 96% in value.

- On 12 May 2022, Terra blockchain’s miners halted mining on the Terra blockchain in order to “prevent governance attacks”.

- The suspension of mining lead to a halt in settlement of all tokens trading on the blockchain, including the Luna native token and the Terra stablecoin.

- In subsequent days, Terra DLT tokens were de-listed from DLT venues. E.g. on 13 May 2022, CoinDesk stated that “Crypto exchange OKX said it planned to end spot listings of UST and delisted margin and borrowing services for Terra ecosystem tokens such as LUNA, anchor (ANC) and mirror (MIR).”

By understanding the link between the DLT financial instrument and the DLT it is issued on, stakeholders can understand which DLT financial instruments are at risk if an individual DLT were to suffer from the issues identified by the BIS report.

The DTI provides this link.
DLT-specific Risks – Governance

The BIS report highlights governance as a key risk of DLT. This risk is supported by recent research from the National Bureau of Economic Research that showed just 0.1% of miners control 50% of Bitcoin mining capacity.

Given the central role of miners to governance for many DLTs, this concentration can result in DLT operational decisions being taken by entities outside the jurisdictions in which DLT financial instruments are issued, traded or settled. Such decisions can result in the suspension or unwinding of settlement of trades, as per the Terra Blockchain use-case.

By understanding the link between the DLT financial instrument and the DLT it is issued / traded / settled on, stakeholders can understand which DLT financial instruments will be impacted if an individual DLT were impacted.

The DTI provides this link.
DLT-specific Risks – Operational

The BIS report highlights operational risk as a key consideration for DLT systems.

An example of an operational issue is the Ethereum hack in 2016 which resulted in a hard fork of Ethereum due to lack of consensus on next steps:

- One section of the community decided to reverse the hacked transactions.
- Another section decided to keep the hacked transactions.

Following such a fork, if the DLT were to contain DLT financial instruments, the issuer would need to identify which fork contained the legitimate token and which fork contained the ‘illegitimate’ copy.

The DTI can facilitate the unambiguous identification of the relevant DLT and the tokens, thereby giving stakeholders confidence that they are interacting with intended DLT.
Interoperability between different DLTs

- DLT landscape is complex and rapidly evolving, with a growing number of new blockchains being constantly created.
- New DLTs can use different technologies (Blockchain, Directed Acyclic Graph, etc) and different concepts to refer to their tokens (smart contracts vs asset codes vs property ids etc).
- DTI is technology neutral and abstracts the technical complexity of DLTs. It facilitates interoperability by providing heterogeneous systems a standard way to refer to:
  - different DLTs
  - different digital tokens on different DLTs

Hashing Algorithms

- Hashing Algorithms
  - Hash function
    - Hashing a string (input)
    - Hash function:
      - #4b5555
      - hashed text
  - Hashed text (output)

Proof of Work

- Many miners compete to solve a puzzle the fastest

Proof of Stake

- A single validator is selected to process the transaction.

Source: BSC News
The ISO standard enables an ISIN to be associated with each DTI record. The diagram illustrates this relationship.

The ISO standard specifies that the ISIN embedded within the DTI record should represent the asset that the DTI token is associated with. The standard provides no further explanation.

DTIF has used the current definitions to populate the ISIN element within the DTI record for existing DLT financial instruments such as the EIB bond issued in April 2021.

The next slide provides the details.
In April 2021, DTIF and ANNA established a joint task force to explore the areas of collaboration to aid in interoperability of the respective identifiers to provide additional benefits to market participants.

The primary focus of the task force has been on non-jurisdiction digital tokens. These are anticipated to be crypto-currencies and other digital assets within the MiCA scope.

The task force plans to consider jurisdiction-based instruments (which are anticipated to form the bulk of DLT financial instruments) at a future date.

Minutes of the task force meetings are available on the DTIF website.
EIB Bond Example

- In April 2021 EIB issued a first ever digital bond on a public chain (link to press release)
- DTIF has issued DTI record for this bond: WGHBLG826 and brings together the following elements:
  - Asset identifier: FR0014003521
  - DLT DTI: X9J9K872S (Ethereum)
- DTIF machine readable reference data allows market participants and regulators to:
  - Map digital token to the Asset
  - Map digital token to the DLT
EIB Bond Hypothetical Example

The table illustrates the relationship between the DTI and the ISIN in the scenario where an EIB bond is issued on two DLTs and where the bonds across the two DLTs are fungible.

In this hypothetical example:

- The DTI for each token on the different DLTs is different
- The ISIN of the two tokens is the same
- The DTI for Functionally Fungible Group (FFG) links together tokens that have the same ISIN
- DTIF machine readable reference data allows market participants and regulators granularity to aggregate transactions by:
  - DLT – using token DTI
  - Asset – using ISIN or DTI (FFG)

<table>
<thead>
<tr>
<th>Name</th>
<th>ISIN</th>
<th>DTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Invest/Zero Cpn Bd (FISN) - FF</td>
<td>FR0014003521</td>
<td>23LMLKNFS</td>
</tr>
<tr>
<td>European Invest/Zero Cpn Bd (FISN)</td>
<td>FR0014003521</td>
<td>WGHBLG826</td>
</tr>
<tr>
<td>European Invest/Zero Cpn Bd (FISN)</td>
<td>FR0014003521</td>
<td>FMKSMDFLS</td>
</tr>
</tbody>
</table>
Coupling of ISIN and DTI

The following slides consider how the coupling of ISIN and DTI for a specific instrument can provide the supervisor with additional information that may be helpful in fulfilling its responsibilities. The slides focus on 3 scenarios:

1. No change to RTS and no link from ISIN to DTI
2. No change to RTS and a link from ISIN to DTI
3. Change to RTS to embed the DTI in addition to the ISIN
Coupling of ISIN and DTI - No change to RTS and no link from ISIN to DTI

This scenario, assumes that ANNA does not embed the list of DTIs associated with the ISIN within the ISIN meta data.

In this scenario, regulators and market participants will have difficulty accessing information regarding the DLT on which the token was issued / traded / settled.

Regulators would have difficulty understanding:

✘ The DLT financial instruments at risk, if a specific DLT were to suffer an operational outage / event.

✘ The individual trades at risk, if a specific DLT were to suffer an operational outage / event.

✘ Where a DLT financial instrument is issued / traded on multiple DLTs, whether there were any price discrepancies on individual DLTs. This is because only aggregate prices (per ISIN) would be readily available, which could result in pricing inefficiencies and lack of transparency.

✘ Raw data transactions from the DLT for a specific DLT financial instrument.

✘ In the event of a fork, to unambiguously identify the fork that contains the legitimate token and the fork that contains the ‘illegitimate’ copy.
Coupling of ISIN and DTI - No change to RTS and a link from ISIN to DTI

This scenario, assumes that ANNA can embed the list of DTIs associated with the ISIN within the ISIN meta data.

In this scenario, regulators and market participants will have partial access to information regarding the DLT on which the token was issued / traded / settled.

Regulators would be able to understand:
✓ The DLT financial instruments at risk, if a specific DLT were to suffer an operational outage / event.

Regulators would have difficulty understanding:
✗ The individual trades at risk, if a specific DLT were to suffer an operational outage / event.
✗ Where a DLT financial instrument is issued / traded on multiple DLTs, whether there were any price discrepancies on individual DLTs.
✗ Raw data transactions from the DLT for a specific DLT financial instrument.
✗ In the event of a fork, to unambiguously identify the fork that contains the legitimate token and the fork that contains the ‘illegitimate’ copy.
Coupling of ISIN and DTI - Change to RTS to embed the DTI in addition to the ISIN

This scenario, assumes that RTS requirements are modified to include the requirement to supply the DTI in addition to the ISIN.

In this scenario, regulators and market participants will have full access to information regarding the DLT on which the token was issued / traded / settled.

Regulators would be able to understand:
✓ The DLT financial instruments at risk, if a specific DLT were to suffer an operational outage / event.
✓ Where a DLT financial instrument is issued / traded on multiple DLTs:
  ✓ The individual trades at risk if any DLT-specific risk were to materialize on a single DLT.
  ✓ Any price discrepancies on individual DLTs.
✓ Raw data transactions from the DLT for a specific DLT financial instrument.
✓ In the event of a fork, to unambiguously identify the fork that contains the legitimate token and the fork that contains the ‘illegitimate’ copy.
AOB
Thank You!

Kindly contact us if you have any questions.

Address:
Suite 21-23, 107 Cheapside, London, EC2V 6DN, United Kingdom

Email: secretariat@dtif.org
Website: www.dtif.org
Appendix
DATA REPORTS: Total Tokens Registered

<table>
<thead>
<tr>
<th>Month</th>
<th>Sep-21</th>
<th>Oct-21</th>
<th>Nov-21</th>
<th>Dec-21</th>
<th>Jan-22</th>
<th>Feb-22</th>
<th>Mar-22</th>
<th>Apr-22</th>
<th>May-22</th>
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<tbody>
<tr>
<td>Blockchain: with native token</td>
<td>52</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>47</td>
<td>47</td>
<td>47</td>
<td>49</td>
<td>49</td>
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<tr>
<td>Other: with native token</td>
<td>3</td>
<td>4</td>
<td>4</td>
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<td>5</td>
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<td>Blockchain: without native token</td>
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<tr>
<td>Other: without native token</td>
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<td>66</td>
<td>66</td>
<td>164</td>
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<td>Functionally Fungible Group</td>
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<td>Total</td>
<td>114</td>
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<td>122</td>
<td>222</td>
<td>285</td>
<td>311</td>
<td>340</td>
<td>496</td>
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## DATA REPORTS: New Tokens Registered

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<tbody>
<tr>
<td>Functionally Fungible Group</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<td>Auxiliary token</td>
<td>57</td>
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<td>1</td>
<td>0</td>
<td>98</td>
<td>63</td>
<td>26</td>
<td>25</td>
<td>156</td>
</tr>
<tr>
<td>Other: without native token</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
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<td>Blockchain: without native token</td>
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<td>0</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Other: with native token</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Blockchain: with native token</td>
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<td>-1</td>
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<td>0</td>
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</table>
# DATA REPORTS: Data Element Validation

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<tr>
<th>Month</th>
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<th>Total</th>
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<tbody>
<tr>
<td>Sep-21</td>
<td>904</td>
<td>1066</td>
</tr>
<tr>
<td>Oct-21</td>
<td>1058</td>
<td>1108</td>
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<td>Nov-21</td>
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<td>Feb-22</td>
<td>2356</td>
<td>2416</td>
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<tr>
<td>Mar-22</td>
<td>2580</td>
<td>2624</td>
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<tr>
<td>Apr-22</td>
<td>2810</td>
<td>2858</td>
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<tr>
<td>May-22</td>
<td>4060</td>
<td>4106</td>
</tr>
</tbody>
</table>

**Chart Description:**
- **Sep-21** to **May-22** shows a trend in validated and total data elements.
- The validated data elements increased significantly from Sep-21 to May-22.
- The total data elements also increased but at a slower rate compared to validated data elements.
DATA REPORTS: Data Element Validation (Normative vs. Informative)

<table>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Normative % Validated</td>
<td>82.31%</td>
<td>92.38%</td>
<td>92.44%</td>
<td>92.44%</td>
<td>94.67%</td>
<td>95.96%</td>
<td>97.23%</td>
<td>97.23%</td>
<td>98.17%</td>
</tr>
<tr>
<td>Informative % Validated</td>
<td>88.22%</td>
<td>99.78%</td>
<td>99.79%</td>
<td>99.79%</td>
<td>99.87%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
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# DATA REPORTS: DTIF Website Statistics

<table>
<thead>
<tr>
<th></th>
<th>April 2022</th>
<th>May 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registry Download Requests</td>
<td>140</td>
<td>138</td>
</tr>
<tr>
<td>Site Visits</td>
<td>1,837</td>
<td>2,545</td>
</tr>
<tr>
<td>Site Visitors</td>
<td>299</td>
<td>575</td>
</tr>
<tr>
<td>Home Page Visits</td>
<td>407</td>
<td>287</td>
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