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Review Article

A Data-Driven Framework for Provider Income Aggregation and 1099 Generation

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Abstract

1099 Provider Tax Application, providing healthcare organizations with an automated 1099 Provider Tax Reporting solution for the full end-to-end process of provider income reporting by enabling automatic electronic reporting to IRS via an approved format, enables healthcare organizations to automate their income reporting processes from the initial provider billing through to IRS electronic filing. 1099 Provider Tax Application utilizes a unique combination of statistical data analysis techniques to identify provider income that is based on the claims payment data and the electronic systems that provide the claims data. Data regarding provider income from all these electronic sources is effectively collated and stored in an S3 data engine environment for future retrieval and aggregation. In addition, because of AWS's Serverless architecture, the 1099 Provider Tax Application can create, and securely deliver to providers, IRS-compliant 1099s on an annual basis. The cloud-native architecture of the platform enhances both the speed and accuracy of tax document filing and ensures compliance with HIPAA and IRS regulations, which greatly reduces the likelihood of human error in the reconciliation and filing of tax documents. Moreover, the flexible nature of the platform would allow for the addition of other types of tax forms and multi-state/country reporting, along with the capability for integration with organizational data lakes and self-service portals for providers. As such, the cloud-native 1099 Provider Tax Application represents an opportunity to develop a reusable template for reporting systems in the regulated financial and healthcare sectors.

Keywords: 1099 Provider Tax Application, IRS-approved, S3-based Data Engine, Cloud-Native Architecture, HIPAA and IRS regulations.

INTRODUCTION

The IRS Reporting Requirements are mandated by the Internal Revenue Code Regulations 1.6050W, which establishes an individual's and a business's responsibility to prepare IRS financial records for income taxation and compliance. The IRS Reporting Requirements ensure both taxpayers and their respective businesses are compliant with IRS laws, have submitted timely and complete information, and receive all eligible tax refunds. Because of the many tax laws that could be viewed as complex, many taxpayers have income from multiple sources, thus requiring them to maintain complex financial records in order to be compliant with IRS Reporting Requirements. Additionally, there are many technological challenges (e.g., outdated automated systems) that can cause significant delays in the processing of IRS Reporting Requirements and potentially result in inaccurate IRS Reports. Finally, there is an increasing amount of electronic data collection, which has raised other concerns about the security and privacy of data collected electronically [1].

However, the IRS Reporting Requirements also provide many benefits, including the use of automated filing software. Automated filing software allows taxpayers to complete tax reporting processes easier and reduces the number of inaccurate IRS Reports submitted, increasing transparency and fairness to taxpayers. Direct filing options through technology are becoming cheaper and more accessible for taxpayers. However, due to the volume of information required to accurately complete an IRS Report, many individuals could experience frustration when filing an IRS Report. Additionally, mistakes that taxpayers make when filing an IRS Report, such as incorrectly calculating a tax due or not correctly reporting some income, could result in fines or even are considered a criminal matter in some circumstances.

Therefore, while the IRS Reporting Requirements are important for ensuring taxpayer compliance with tax laws, and although there are efficiencies and fairness as a result of the IRS Reporting Requirements, there are also significant difficulties with regard to the complexities of preparing IRS Reports, the accuracy of IRS Reports, the privacy of data that is included on the IRS Reports, and the costs associated with preparing IRS Reports [2].

The 1099 Provider Tax Application has been created to assist healthcare providers in addressing the significant issues surrounding the creation, retention, and accuracy of a provider's revenue generated through filing claims for services rendered in the health care insurance claim's environment. Due to the number of claims a provider may submit to multiple claims payers and the various payment methods available to pay for insurance claims, it is inefficient and error prone for a provider to manually aggregate all claims that were submitted to create their IRS Reporting Reports. By automating the collection of payment data from claims, this solution provides providers with an efficient means of collecting, reconciling, tracking, and accounting for all payments received and processed through claims during the course of the year. At year-end, income data collected throughout the year will be used to create IRS-compliant 1099 forms for the providers for tax filing.

The automated nature of this system will improve compliance with regulations, decrease opportunities for mistakes, lower the need for human work hours, provide an independent record of every transaction, and create an accessible database for any necessary audit purposes. Ultimately, the purpose of this automated system is to provide a more efficient way to report provider income and to ensure accurate reporting for every single payment received by every provider per fiscal year. The technology within the automated payment processing component will lower the risk of incomplete or incorrect records and reports associated with manual payment processing because payment processing will occur automatically, without further manual intervention.

Automated generation of the IRS 1099 form will also support providers' ability to remain compliant with federal tax laws, thus providing another layer of assurance to providers that they will have accurate reporting of tax liability to the IRS. With automation of provider income reporting, this technology will greatly reduce the time spent on report preparation for providers, while simultaneously ensuring that providers will have an accurate and thorough report available for any future audit, as well as to satisfy any compliance regulations for income reported to the IRS. Future enhancements may include functionality that supports compliance monitoring, create dashboards for administrator users and provider users that provide visibility into their real-time compliance information, develop machine-learning technologies for identifying providers that are out of compliance or are submitting incorrect tax information, and provide provider self-service access to tax records and income summaries through the systems' portal(s). All these improvements to the current automated system will allow for improvements in the effectiveness of the system at providing an accurate, timely, compliant, and complete report of provider income in the future.

Automating the reporting process through an electronic method will enable providers to compile payments from multiple sources into one report, increasing accuracy and compliance by allowing regulators access to providers' records (as opposed to having them fragmented due to manual data processing). This automated reporting system will allow for compliance with IRS tax reporting requirements (such as 1099) to ensure that regulators can verify that providers are accurately reporting their taxable income. This automated reporting will also increase efficiency and accuracy in reporting income, creating the opportunity for providers to report income on-time and prepare for audits. It will enhance operational efficiency for providers and improve compliance once this process is established. Improvements will also be made to the automated reporting system to include enhanced compliance features, dashboards for real-time reporting; using machine learning algorithms to identify provider income reporting patterns that might indicate compliance issues [3].

Furthermore, this system will integrate provider service portals, allowing for one single portal where providers and users can access tax/income summary information, which will improve users' overall experience and ease of use. Integrating these features and functionalities will greatly increase the effectiveness of the automated reporting system to produce accurate, efficient, and compliant reports of provider income and the use of predictive analytics to help identify income irregularities and noncompliance [4]. The 1099 Provider Tax Application (TAP) provides a complete solution for the reporting and compliance management of healthcare providers. This application consists of a number of critical components that work together to facilitate the correct reporting of income from the proceeds of healthcare services rendered by individual providers.

The Data Aggregation Engine provides a means of aggregation of all revenue streams from different sources and processes into a consolidated data set, eliminating manual reconciliation issues associated with fragmented healthcare environments and enabling the generation of accurate year-end tax documents without having to re-create those documents manually. The TAP has a built-in rules-based calculation engine, allowing organizations to maintain existing payment types and thresholds while providing the flexibility to adjust data appropriately as needed to remain current. The TAP automates the secure electronic delivery of year-end tax

documents and provides a means for providers to obtain a record of the reported income to both the provider and the IRS. As a result, compliance risk is reduced, and audit performance is improved.

The solution leverages AWS Cloud benefits such as enhanced serverless automated claims processing, enhanced serverless data storage capabilities, and enhanced serverless monitoring capabilities to maximize efficiencies in claims processing. Furthermore, the TAP incorporates comprehensive data protection safeguards that meet HIPAA and IRS regulations, including strict access controls, audits, and encryption of sensitive financial data. Ultimately, the TAP is a fully integrated solution designed to increase operational efficiency, improve audit performance, and ensure compliance with the reporting requirements mandated for healthcare providers.

Through automation of the provider income data aggregation process, rule-based 1099 calculations and annual 1099 reporting, this system greatly improves both operational performance and compliance capabilities for healthcare organizations. By removing the need for a human to reconcile data, significantly reducing human error and increasing the speed of reporting, the 1099 Provider Tax Application allows organizations to more quickly and accurately complete their year-end reports and mitigate substantial compliance penalties during compliance audits. The AWS cloud architecture provides real-time data monitoring and scalability through its cloud-native architecture and scalability allows for a seamless integration platform for processing large volumes of claims with minimal delay. The application provides a transparent, secure and scalable foundation for revenue reporting for healthcare providers through stringent protection against identity theft and breaches of security of sensitive financial data through encryption, audit trails and user-level access controls.

Background Work

Multiple articles, papers, research titles, etc., explain methods, obstacles and opportunities in Health Care Provider income reporting Systems. Paying for Performance (P4P) research explains how to prepare, structure and report Health Care Provider income, by using design elements such as Incentives (Pay for Performance schemes), Performance Measure Type (Metrics) and Payment Mechanisms. Research identifies Challenges, including Data Accuracy in income reporting, Variance of income Reporting Schemes and Incentives/Outcomes goal alignments. These papers generally propose the development of reporting framework/typologies to Standardize/Compare the Reporting mechanisms, along with improving Compliance and Transparency of Provider income reporting. The research used in this area also includes both statistical analysis and Data Collection, and demonstrates Relationships between Patient Access, Physician Responsiveness, Patient Satisfaction and Economic Inequality. Although these studies have helped improve our understanding of Health Care Disparities and the Identification of Targeted Interventions to Remove these Disparities, they also raise important issues regarding Data Accuracy and Privacy and Bias in Revenue Reporting [5][6].

Articles on Public Reporting in Health Care Systems focus on how to maintain efficiency and comply with regulatory requirements, using automated Data Aggregation Systems, Rule-Based Computing and Cloud-Based Technology. Each of these methods provides a way to aggregate and report patient and provider level data, while also securing and protecting data using Best Security Practices and making the reporting mechanisms and aggregation systems scalable. Using these approaches, Health Care Provider and Patient Data aggregation will generate increased Transparency of and Efficiency in Health Care Provider income reporting. There are many operational difficulties in these Systems, such as: 1) Maintaining Data Accuracy, 2) Adapting to Regulatory Changes and 3) ensuring that Data is Processed Securely. While these findings are supported by a number of studies, they indicate that the process of reporting Income for Health Care Providers has been shown to provide an effective means of Protecting Patient Privacy and also meeting the requirements of the Current Regulatory Environment while Supporting the On-going Success of this Constantly Changing Industry [6].

A number of studies focusing on the method(s) of income reporting in primary care have demonstrated the existence of several different means of documenting primary care revenue, each with its own strengths and weaknesses. Specifically, while the use of sociodemographic surveys has proven helpful when seeking to identify socio-economic determinants associated with health outcomes, response bias(most notably in the form of language barrier) significantly affects the data being collected from minorities and/or non-English speaking representatives. As a means of counteracting response bias and better understanding patient perceptions, many studies have utilized a mixture of quantitative and qualitative survey methodologies. Although automated data collection has improved the reporting accuracy of health systems, many patients are reluctant to utilize an electronic health record for fear of compromising their personal information.

In the absence of continuous, consistent and accurate data regarding the impact of social and economic status on health outcomes, and policies born of these factors, significant administrative resources are needed to assemble and maintain the significant amount of data necessary to develop equitable health policies. Priority of Response will continue to be given to research methodologies such as stratified random sampling or integrated survey methodology to address low response

rates. In summary, income reporting for primary care has indeed changed over time, and in order to ensure equal distribution of health-related policies, efforts must be made to develop technological solutions in conjunction with patient-oriented approaches to promote on-going evaluations of reporting systems [7].

The methodology development process of this type will provide avenues by which the reporting obligations of pay-for-performance arrangements can be achieved through consistent evaluations across all pay-for-performance arrangements. Research has found that one common way to compare health systems worldwide would be to develop a systematic structure for reporting across countries through the use of multiple dimensional tables so that researchers could easily see the key components (payment methods, performance measures and incentive structures) and understand how these components were structured within each country's health care system. The ability to have reliable and consistent comparisons among countries requires the use of inter-rater reliability measures (e.g. Fleiss' Kappa) to establish agreement between raters on each component's classification.

Comparative approaches use both qualitative and quantitative methods to evaluate health care systems. Quantitative methods are primarily used in the form of benchmarking (comparison of a system to peers or the industry's standards), statistical analysis of performance data and aligning compensation to performance measures. Qualitative approaches concentrate more on the governing structure and overall design of a system (including identifying best practices), but with an emphasis on transparency. There are also some models which incorporate both qualitative and quantitative methods for a more complete view of the components used within a country's health care system.

The assessment frameworks discussed in this section emphasize the importance of considering local context (such as culture and economy), local disclosure policies and local market conditions when developing methodologies for assessing health care systems. Adding qualitative and blended peer review techniques to support the development of multiple-test scorecards enhances reliability and transparency of P4P assessments. Collectively, these methods allow researchers and policy makers to rigorously analyze P4P reporting frameworks and assess best practices, thereby providing a means to improve the efficiency of provider payment programs.

Programs such as the Medical Expenditure Panel Survey and the Consumer Assessment of Healthcare Providers and Systems have been designed to examine the influence of income on patient-reported outcomes. Each of these programs collects information from patients regarding their level of satisfaction, the decision-making process with providers, communications with providers, and accessibility to care, and then they use ordinal scales to analyze this information. Researchers then apply statistical models (e.g., regression model) to establish the relationship between income level and patient experiences (while controlling for other confounding variables such as age, sex, race, insurance status and education). Research consistently shows that patients with lower incomes report having poorer experiences with health care than patients with higher incomes. Additionally, using composite scores and sub-group analysis to evaluate the relationship between income and patient-reported outcomes increases the reliability of these studies. This research continues to show that there are continued disparities in the health care experiences of patients by income level. This implies the need for initiatives aimed at eliminating disparities in health care experiences [11][12].

System Architecture

The architecture of the 1099 Provider Tax Application on AWS has many components and processes that are interrelated. The process starts with the claims system (the system that generates provider revenue data). The provider revenue data will be held within Amazon S3; S3 will serve as the primary data lake for both raw and processed claim data. ETL is performed on the claims data using AWS Glue and is transformed into a common format. AWS Lambda manages the automation of annual 1099 form generation and income calculation according to the company's established rules. Operational visibility is maintained with Amazon CloudWatch, which monitors all operational processes and notifies users of any problems. AWS IAM & KMS help maintain security/compliance for data by providing encryption, permissions, and audit logs that fulfill the IRS and HIPAA requirements for both the provider and the IRS. Once the claims data is received from S3, it can be processed with AWS Glue; profits calculated with AWS Lambda, validated 1099 forms generated, and sent safely to the IRS and by the provider. So, the use of AWS services allows for a scalable, reliable, and compliant solution to the problem of 1099 drug reporting, as illustrated in the following figure.

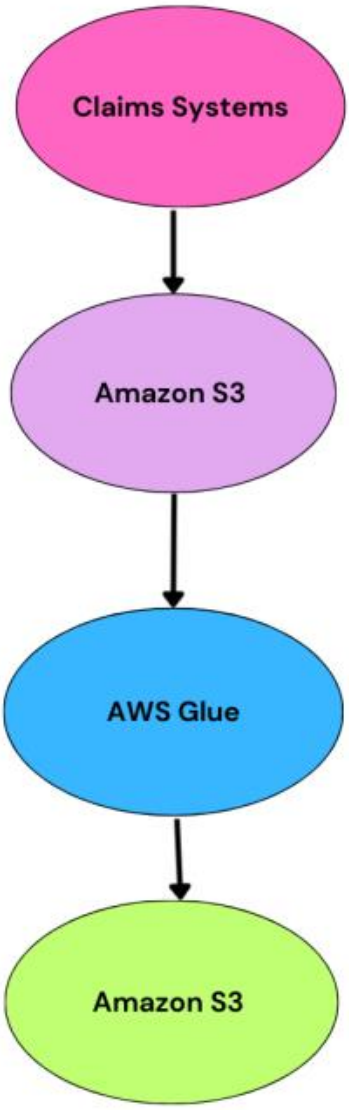

Figure 1: Data Aggregation Engine

- **Data Ingestion**: Multiple claim systems provide unprocessed provider revenue data through automated pipelines to store data in Amazon S3. The data stored in S3 can be audited and traced back to the original provider.
- **ETL Procedures:** AWS Glue is used to extract, transform, and load (ETL) data from multiple sources to create a standardized data format.
- **Profit Computation**: AWS Lambda functions run configurable business rules to calculate each supplier's 1099 profit based on changes in government regulations.
- **Reporting:** The generation of annual 1099 forms is automated with AWS Lambda. The 1099 form will always be encrypted and transmitted securely. Additionally, the data in a 1099 form can be verified using real-time data verification. Cloud Integration: Amazon S3 acts as a secure and scalable data lake for both raw and processed data. It can be integrated with AWS Lambda to automate the reporting of 1099 data to the IRS.
- **Monitoring and Notifications:** Amazon CloudWatch stores and monitors system performance, and alerts users of any irregularities or failures.
- **Compliance and Security:** A strong data encryption method and process are implemented by utilizing AWS Key Management Service (KMS) for HIPAA and IRS compliance through access controls via AWS Identity and Access Management (IAM) and S3 bucket policies.

There are several ways that AWS can securely store and retrieve large volumes of unstructured data and protect the integrity of 1099 forms. Amazon S3 should be used because it has fine-grained access control, multiple options for data encryption, and has an integrated solution with AWS Security Hub. For long-term archival of 1099 documents that will require very

few accesses over time, Amazon Glacier is recommended due to the low cost of storing these documents, and the flexibility in howAWS Storage Gateway allows for quick and simple access to files stored in the hybrid cloud. Each service above has: Encryption, Access Control, Audit Logging, and being Compliant with the Data Security Standards of HIPAA and IRS.

When considering whether to use S3 or Glacier as a long-term retention solution for 1099s, the primary question is: How often will the document be accessed? Generally, S3 would be most appropriate for documents that require immediate access to them and Glacier would be appropriate for those 1099s that are required by IRS regulations to be retained. To restrict access to 1099 Forms stored on S3 buckets, you must set up a bucket policy that uses several different types of access control strategies. First, you must identify which IAM Users/Groups/Roles have access to the bucket. You will need to use Principal Based Access as you create your policy so that only those individuals responsible for managing the access to 1099s will have access to the bucket. Additionally, you must create Explicit Deny Statements that define which IAM principals are Denied Access to the bucket. By doing so, you will ensure that anyone who is not an identified principal will be denied access. Second, you need to restrict access within your bucket by defining specific items or prefixes that can be accessed, for example, only allowing access to items in the 1099 folder. Third, you should use Condition Keys to restrict access, based on IP Address, VPC Endpoint and/or Time Conditions. Finally, all requests to S3 must be encrypted with either the SSE-S3 or SSE-KMS Encryption Methods.

The Architecture is built using a Server-less approach to enable Scalability, Performance and Reliability while reducing Operational complexity through the use of AWS Services, such as Lambda and S3, along with IaC (Infrastructure as Code) Principle to Automate Deployment of the Architecture through the use of AWS CloudFormation. Data ingestion is performed using AWS services like Amazon Kinesis, or via direct ingestion into an S3 bucket, which allows for processing data from a range of claims systems both in near real-time (streaming) or in batch mode. AWS Glue performs the ETL functions to enforce quality and standardization on the ingested data. Data is aggregated using the Map-Reduce method, where multiple Lambda functions perform pre-aggregation, and all the pre-aggregated data is then stored within a single Lambda function for consolidation. The primary data lake is stored in an AWS S3 bucket and is configured to have tiered storage options depending on how the data will be accessed. Business rules describing how to calculate 1099 earnings are also set up in Lambda functions for flexibility as laws change frequently; this is part of the overall AWS data architecture built for scalability, resilience and the capability of efficiently managing and processing large volumes of data. The AWS Well-Architected Framework and AWS patterns including Event Sources and Circuit Breakers provide necessary components that support operational excellence, security, dependability, performance efficiency, cost optimization and sustainability for AWS data solutions.

In addition to providing modern data architectures that help businesses build real-time data stream processing tools and capabilities for Data Warehousing, AWS provides built-in support for data analytics through services such as AWS Glue, EMR, Athena, Redshift, Kinesis, and MSK. By leveraging the full range of AWS capabilities across these service offerings and building an effective structure for Data Warehouse or Analytics within their organization, businesses will be able to make decisions based on readily available real-time data. Using the Zachman Framework helps to ensure that the data architecture aligns with the company's business objectives; in addition, the use of conceptual, logical, and physical data models ensures that data models are built in a structured manner. Tools such as Terraform and AWS CloudFormation allow companies to automate the deployment and management of their infrastructure-as-code, ensuring that their environments are consistent. By automating the data integration and ETL processes, companies are able to automate the transformation and ingestion of data to AWS using AWS Glue and Data Pipeline and to automate the enforcement of data governance and data literacy, as well as access controls, on their data through the use of AWS Lake Formation and Amazon DataZone. These are some of the best practices to optimize data infrastructure for scalability, security, and effectiveness when using AWS and align these infrastructures with both business and technical requirements.

Data Lakes and Data Warehouses are not interchangeable and serve different purposes. Data Warehouses such as Amazon Redshift are designed for managing organized and processed data using a schema-on-write approach to define the structure of the data before it is loaded into the warehouse; therefore, Data Warehouses are highly optimized for performing quick structured queries and are ideal for supporting SQL-based analytics, reporting, and Business Intelligence applications, however, this high performance normally comes with a high cost in terms of processing and storage. In contrast, Data Lakes such as those created using AWS Glue and Amazon S3 are used to manage raw unprocessed or unstructured data using the schema-on-read model to support flexible ways of exploring and analyzing data, including artificial intelligence (AI) and Machine Learning (ML). Data Lakes are typically much more cost-effective for storing data than data warehouses; however, due to the many different ways that data can be processed from data lakes, they may incur higher processing costs. Data Lakes can typically accommodate large volumes of raw unstructured data

and can provide a higher level of adaptability to support the types of data used depending on how the data is stored and processed. In many organizations, the combination of Data Lakes and Data Warehouses provides organizations with the ability to quickly analyze and report on high-performance analytics while simultaneously providing the capability to use Data Lakes to store large amounts of raw data for future processing, the strengths of each system provide balance to organizations in how they fulfill their analytical requirements, which can be seen in Table 1 below:

Table 1: Comparison of Data Lakes and Data Warehouses on AWS

Feature	Data Warehouse (e.g., Amazon Redshift)	Data Lake (e.g., Amazon S3 + AWS Glue)
Data Type	Structured, processed, and curated	Structured and unstructured, raw or processed
Schema	Schema-on-write (defined before loading)	Schema-on-read (defined at analysis time)
Storage	Columnar, optimized for analytics	Object storage (S3), scalable and cost-effective
Use Cases	Business intelligence, reporting, SQL analytics	Exploratory analytics, machine learning, AI, data discovery
Query Performance	Fast, optimized for structured queries	Slower, requires processing for complex queries
Cost	Higher for storage and compute	Lower for storage, higher for processing
Users	Business analysts, reporting teams	Data scientists, engineers, analysts
Flexibility	Less flexible, requires predefined structure	Highly flexible, supports diverse data formats
Data Quality	High, data is curated and validated	Variable, depends on processing and governance

Implementing certain safety protocols is critical for securing AWS S3-based data lakes on AWS. One of these protocols is enabling AWS KMS (Key Management Service) for the server-side encryption of all data stored in S3, with only specific IAM (identity and Access Management) Roles allowed to use the encryption keys. You should implement Fine-grained IAM Access Control when it comes to giving out permissions. By carefully issuing permission to an individual or group of IAM user and by only granting them access to an S3 bucket or Lake Formation resource when they need it, you will have more control over your data. S3 Bucket Policies should be used to limit public accessibility, and provide a mechanism for enforcing encryption by preventing unencrypted object uploads, along with allowing the ability to manage how an object is added to your bucket.

With respect to providing more advanced security features, you could register your S3 location through Lake Formation. This gives you the ability to create row-level and column-level IAM use or role access restrictions tailored specifically for each of your IAM users or roles. You can also use the option of enforcing storage-level Permissions in Lake Formation, so that all policies are correctly enforced at both the storage-level and catalog-level. Finally, to maintain oversight over your Data Lakes, AWS S3 Access Logs and AWS CloudTrail should be turned on to audit and monitor all actions taken with respect to your Data Lake Resources. The combination of these methods will provide a comprehensive set of auditing capabilities, central and granular access control options, and a strong level of encryption for Data Lakes hosted on AWS. (continued...) Additionally, the performance and influence of the Data Aggregation Engine and the modules belonging to the Data Aggregation Engine can be assessed utilizing different metrics. For example, the Data Ingestion Rate is the metric used to measure the number of claims processed; The Data Completeness Rate indicates the success rate of claims that were successfully fully absorbed.

Data Latency is the amount of time it takes before claims become viewable in the data lake. The Error Rate is the number of claims that were denied because they did not conform to format or validation specifications. Computation accuracy measures the correlation of the outputs of the1149s with manual audits, whereas Rule Coverage measures how applicable rules and regulations are to the various types of providers in the healthcare space. The validation pass ratio measures how well supplier data pass in real time tests. For provider and IRS reporting, the Form Generation Time is the time required to create replication forms, while the Form Delivery Success Ratio is the percentage of replication forms sent to either the IRS or the providers successfully.

The Compliance Ratio is an indicator of compliance with the requirements imposed by the IRS. The evaluation of our integration with the AWS Cloud will be based on Pipeline Uptime, the Lambda Execution Success Percentage, and the number of CloudWatch Alerts that indicate the overall health of the system. Compliance and Security Metrics will include the amount of Encryption Coverage, the number of Access Violations, and the amount of Audit Log Coverage. Manual Reduction Efforts will be included in the Impact Metrics as a metric, as well as Reduction of Errors, Pass Percentages in Compliance Audits and also Provider Satisfaction with Reports on Accuracy and Timeliness. Using this set of Metrics together provides insight into System Performance, Accuracy, Compliance and Operational Efficiency, while providing the opportunity to drive continuous improvement and effective service delivery.

Medical Data sets that may be leveraged to develop charts for visual representation may include data such as Medicare Claims Data. This data provides De-Identified Claim Files that contain Beneficiary Information, Payment Trends, etc. in conjunction with EHR data that have historically been collected and have been contemporaneously updated or created over time to reflect an Electronic Health Record (EHR) for each patient, including specific information regarding Diagnoses, Treatments, therefore developing Financial Results, Patient Health Trend data etc. Hospital Performance Data includes length of a hospital stay, Patient Outcomes, so this information may be used for financial reporting, and improve Operational Efficiency, etc. Public Health Statistics allows for a defined Aggregation of Health Indicators specific to an overall National or International Health Condition, as well as, Document Mortality Rates, and may be used to demonstrate Disease Prevalence. Clinical Trial Data, which includes demographics of participating patients and their respective Treatment Responses, can be used to identify Patterns of Safety and Efficacy in a Clinical Trial. Data sets which include items described may be accessed using specialized Platforms or Public Repositories. Data sets of this nature are utilized routinely by Healthcare Organizations to create user interactive dashboards and Compliance Reports (see below Figure 2 [14]).

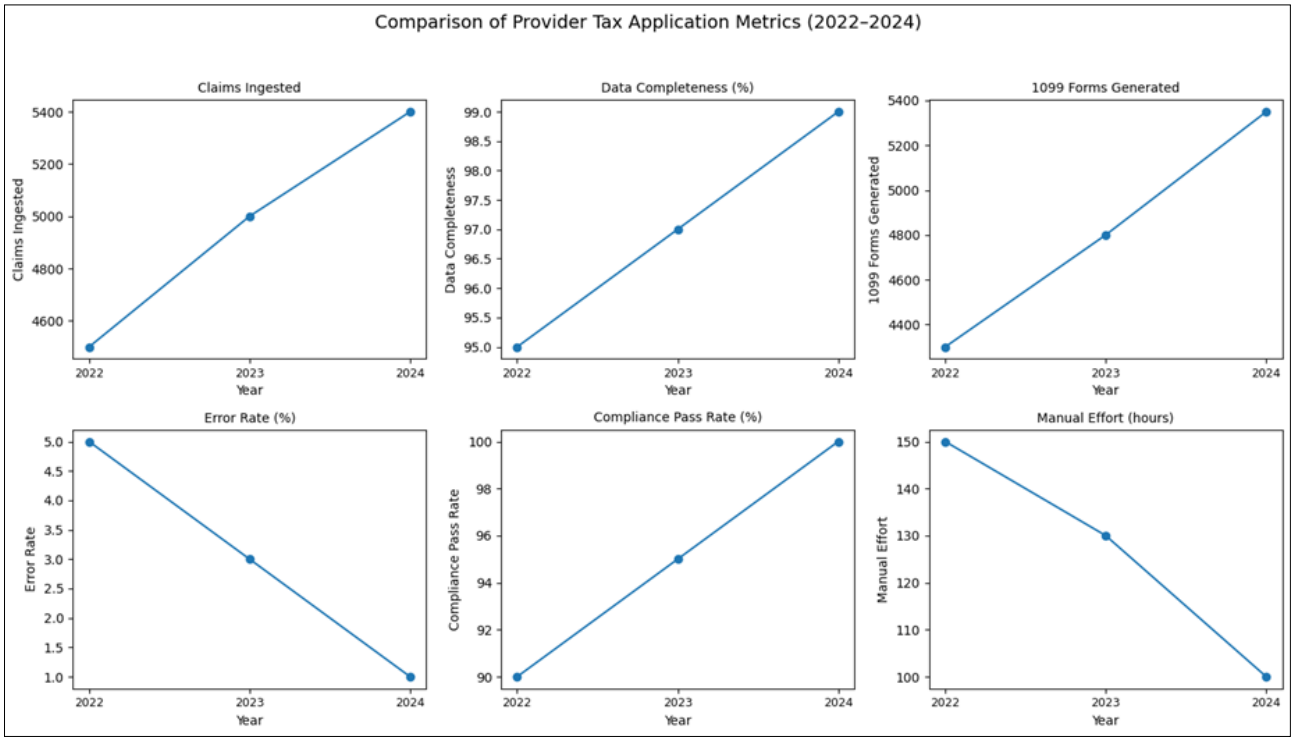

Figure 2: Comparison of Provider Tax Application Metrics

CONCLUSION

The 1099 Provider Tracking Solution is a cloud-based and serverless solution for provider income reporting that allows the 1099 Provider to eliminate a majority of the labour required to perform manual reporting and maximize the accuracy, speed and compliance of the provider's tax reporting. The 1099 Provider Tracking Solution applies a unique cloud-based, serverless framework to manage nationwide provider tax reporting through a combination of IRS/provider integration, automated calculations of gross revenue by an automated rules-based engine and data aggregation. By using the 1099 Provider Tracking Solution Data Aggregation Engine, Providers can accurately compute 1099 income by aggregating revenue from multiple sources into one auditable source, ensuring consistency and accuracy. The use of automated calculation and real-time validation has increased Providers' belief that the reported earnings are accurate, while reducing errors in the reconciliation process. Within the AWS ecosystem, there are multiple monitoring solutions, making it easy to monitor the availability and performance of the 1099 Provider Tax Application. The cornerstone of our application to meet the requirements of HIPAA and the IRS is through end-to-end encryption and extensive, detailed logging and audit trails. In upcoming releases, we will add advanced Analytical Capabilities for Detecting Anomalies in Provider Reporting, Configuration-Driven Updates for Providers for more extensive Regulation Compliant Scanning, XYZ Self-Service Portals for Providers (11), Integration of 1099 Data into the Enterprise Data Lake for Cross-Domain Analysis, and increased Resiliency and Performance via autoscaling and cost-effective solutions.

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