Requirement life cycle for customer segmentation for a telecommunications company

* Introduction:

At the heart of driving your business is understanding your customers, a key to engaged in the growing your business but also keeping your customers happy in this competitive telecommunications market of today. Customer segmentation, the practice of dividing your customers into groups based on similar behaviors, and needs, is one powerful tool to help you do this.

* Importance for telecommunication companies:

Customer segmentation is crucial for telecommunication companies (examples like improving marketing strategies, customer retention, pricing strategies).

* Business objectives:

Business objectives understand the company’s goals for customer segmentation (example optimizing pricing models, identifying high value customers).

Data requirements: The data needed to perform segmentation. For telecom companies, this includes:

* Customer data like age, location, and income
* Usage data like call minutes, data usage, and plan type
* Customer feedback and behavior data
* Functional requirements :

Functional requirement defines what the system should do, or the specific functions that the system should perform. They describe the system’s behavior, inputs, outputs, and interactions with users and other systems.

Examples of functional requirements:

1. Network management:

* Monitor and manage network performance
* Track usage and detect outages

1. Customer management:

* Manage customer accounts
* Track usage and handle billing inquiries
* Process service request

1. Service provisioning:

* Provision new services
* Assign phone numbers and configure service plans
* Activate/ deactivate services

1. Billing and charging:

* Generate accurate and timely bills
* Calculate usage charges and apply discounts
* Handle payment processing

1. Security:

* Ensure confidentiality, integrity, and authenticity of customer data
* Encrypt the sensitive information and control access to authorized personnel
* Non - functional requirements:

Non – functional requirements define how the system should behave, or the quality attributes that the system should possess. They describe the system’s performance, security, usability, and other characteristics that are not related to specific functions.

Examples of non – functional requirements:

1. Performance:

* Respond to user input within 2 seconds

1. Availability:

* Be available 99.99% of the time
* Have a maximum downtime of 5 minutes per month

1. Security:

* Ensure all customer data is encrypted and secure
* Conduct regular security audits and penetration testing

1. Usability:

* Be intuitive and easy to use
* Have a user – friendly interface and minimal training required for customer service representatives

1. Scalability:

* Be able to handle increased traffic and usage
* Scale up or down as needed

1. Reliability:

* Be able to recover from failures and outages
* Have a maximum recovery time of 30 minutes

1. Maintainability:

* Be easy to maintain and update
* Have a modular design and minimal dependencies

Creating a customer segmentation model for a telecommunications company requires a systematic approach to ensure that all requirements and data has been collected, managed, and implemented.

Requirement life cycle for telecommunications company are:

* Goal - We have to define the objective of segmentation like customer needs, behavior, observing the marketing strategies and offers personalizing.
* Elicitation – First we should identify the stakeholders like marketing teams, product managers who will get impact. We should get input from stakeholders regarding their needs, expectations for segmentation model. Example - the stakeholders are from marketing team, sales team, and customer service team.
* Analysis and documentation – Analysis can helps us to gather the require data and data sources, qualities and for easy documentation. It can also help us to know about customer complaints, transaction history and service history. “Documentation” means to provide the proper documentation like how it works, how to access it and how to maintain.
* Validation and verification – Validation evaluate the segmentation model is representing all requirement needed that shows stakeholder’s need and expectations. Verification ensures the standards and guidelines and quality of the documents.
* Prioritization and negotiation - Prioritization have very important role in requirement life cycle because it focus on prioritizing stakeholder’s needs and expectations, prioritizing the high value customers, prioritize requirements related to business value, risk, and ensure effective allocation of resources. Negotiation also plays vital role in requirement life cycle for customer segmentation as it resolves the conflicts, manage the expectations of stakeholders, and allocate resources.
* Change management – It can help to manage the requirements changes of stakeholder’s needs and it ensure that the changes are documented and communicated.
* Communication & collaboration – Communication helps in understanding the requirements and their implications and collaboration help to maintain the vision of project between different teams.
* Traceability and impact analysis – Requirement traceability helps to manage requirements by linking them with design elements and test cases and also to identify the impact on changes. Impact analysis helps to evaluate the possible effects of the changes on project scope, schedule, budget, and resources. Impact analysis helps to identify the risks with changes to requirements and also help to communicate about the possible changes to requirements with stakeholders.
* Implementation and testing – Implementation includes developing the solutions and also helps to validate the requirement by providing the solution. Testing ensure implemented features meet the specified requirements and function.
* Validation and acceptance –Validation ensures that the documented requirements represent the stakeholders needs and expectations. Acceptance includes the formal approval from stakeholders and it ensure that the stakeholders are satisfied with solution.
* Deployment and maintenance – Deployment ensures the system can handle real time data processing and is scalable. Maintenance ensures the system is updated with new data resources, models, and features that is needed.
* Retirement and archival - Requirement removes the unnecessary requirement and obsolete from the active list, reduces the complexity and improves maintainability. Archival is the process for storing retired requirement in a secure and accessible location. Archival involves preserving the requirement’s history, context, and related documents. It also support auditing and compliance by maintaining a record of their existence.
* Practical example:
* Company – ABC telecom
* Goal : Creating a customer segmentation model to improve marketing efforts, reduce churn, and target specific customer groups with tailored offers.

ABC telecommunication firm would like to enhance customer retention through the identification of high risk customers who are likely to churn and the provision of targeted incentives. They would also like to have customer segments for custom marketing campaigns( e.g. provision of data plans, promotions, or bundles depending on customer behavior).

* Stakeholder identification :

Marketing team desires to use segments in targeted campaigns.

Data science team would be responsible for developing the segmentation model.

Customer service team will utilize the segments for proactive retention.

Product team is interested in targeting specific segments with specific product offerings.

* Initial requirements gathering :

Marketing desires the model to segment customers based on value (e.g. high value, low value).

Customer service requires to determine customers who are likely to churn.

The product team is interested in knowing the ways in which customer usage behavior shapes new product preference.

* Requirement elicitation & analysis :
* Data collection & analysis :
* Available data: Customer demographics (age, location, income), usage patterns(data consumption, call frequency, customer service interactions), billing history( spending, payment issues), customer satisfaction surveys, churn data and product preferences.
* Data gaps: Missing customer feedback data, inconsistent CRM system records, and missing customer interaction history.
* Segmentation goals: Identify customers with high likelihood of churn and offer retention promotions to them.

Segment customers according to their spend, usage patterns, and lifetime value to make marketing campaigns optimal.

* Technical requirements:

Process large scale data using a data processing platform (e.g. Hadoop, spark).

Deploy a machine learning model (e.g. k means clustering) for segmentation.

Integrate the segmentation model with the CRM system to facilitate marketing campaigns based on the segments.

* Segmentation criteria:
* Demographics: Age, location, income.
* Behavioral: Data usage, call frequency, customer service interaction, complaint history.
* Churn prediction: Historical churn data, payment issues, service dissatisfaction.
* Requirement specification & design
* Business requirements specification (BRS):
* High value segment: Customers with high lifetime value, frequent data usage, and positive engagement.
* Churn prone segment: Customers with declining usage patterns, frequent customer service complaints, and late payments.
* New customer segment: Customer who have just joined, with limited data and engagement history, but are highly likely to be cross sold additional services.
* Functional requirements:

The segmentation model should allow marketing teams to create customized offers for each segment.

The system must integrate seamlessly with ABC telecommunication CRM to push segmented customer data into marketing automation tools.

* Non functional requirements:

The system should support real time processing of data to return updated segments.

The model should scale with an increasing customer base.

Security should be GDPR compliant for customer data protection.

* Design of user interface:

A marketing team dashboard to see how segments are performing and drill down into customer data.

A simple to use interface for customer service to see at risk customers and act in advance.

* Development &implementation:
* Data preparation:

Clean and preprocess customer data (e.g., handle missing values, normalize data usage patterns).

Feature engineering to create new variables that can help in segmenting, such as average monthly spend or time since last customer service call.

* Model development :
* Algorithm selection: Apply unsupervised machine learning(e.g., k-means clustering) to partition customers into different segments.
* Model training: Train the model with past customer data, with particular emphasis on customer churn behavior, usage patterns, and product affinities.
* Model evaluation: Measure the clustering performance using metrics such as silhouette score, and make adjustments accordingly to enhance the appropriateness of segments.
* Integration:

Create APIs to implement the model in the CRM system and marketing platforms. This enables marketing teams to use the segmentation results in real time for campaigns.

* Testing & validation: Validate the data preprocessing, segmentation algorithms and CRM integration features also the marketing tool functions by testing them.
* System testing: In the system test, make an all out effort to ensure that everything is in good shape. For example, you must check that when a customer is allocated to a special segment marketing campaigns can be launched automatically.
* Model validation: Compare the model output with actual business outcomes (e.g., did churn predictions match actual churn occurrences?).

A/B testing : Execute marketing campaigns for various segments to compare the effectiveness of targeting segments of customers.

* User acceptance testing(UAT): Have the marketing and customer service teams validate the output of the model.
* Deployment & roll out
* Deployment plan **:** The model will be deployed to production, where it process real time data and assign customers to segments as new data comes in.
* Training: Provide training to marketing and customer service teams on how to use the segmentation model. Such issues as how to interpret segments and when to plan your campaigns are addressed here.
* Documentation: Detailed documentation that describes what the model accomplishes or is seeking to judge; how each segment meets certain criteria or does not and how it integrates with existing systems(CRM, marketing tools).
* Monitoring & maintenance
* Continuous monitoring: You need to monitor the performance of the segmentation model in order to observe key metrics (such as conversion rates, churn reduction).
* Model drift management: The model might become somewhat outdated as time goes by, so there is a need to regularly retrain it with new customer data.
* Feedback loop: Let the marketing and customer service people take a look at how the segments perform.
* Evaluation & optimization
* Performance evaluation:

It is recommended to use Business metrics such as reduced churn rate and increased customer lifetime value to check how effective your model was at achieving its objectives after six months.

* Optimization: Model fine-tuning and the parameters of features, dependent variables or classification methods can all be successively analyzed.
* Outcome:

After deploying the customer segmentation model, ABC Telecom has successfully:

Churn-prone customers, who are treated with special retention offers like discount plans or extra customer service, receive high priority support and are the main targets to be considered in this document.

High value customers who receive premium offers and exclusive services.

These findings are the basis for marketing campaigns that result in higher engagement, lower churn, and better customer satisfaction.

This illustration exemplifies how the disciplined "Requirement life cycle" can be realized in the practice of developing a customer segmentation model so that the project is suitably aligned to business objectives as well as address the requirements of all stakeholders.