Intelligent Customer Service
with SAP Service Cloud
Intelligent SAP C/4HANA Experience

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“By 2022, 72% of customer interactions will involve an emerging technology such as machine-learning applications, chatbots or mobile messaging.”

Source Gartner
First: Some context
Why it matters!
Key trends impacting the digital transformation of customer service

Customers
- New rules of engagement: Customer experience matters
- Digital beats phone: Dramatic shift in channel preferences

Technology
- Rise of the machines: Artificial intelligence (AI) and machine learning
- Everything is connected: The Internet of Things (IoT)

Business
- New business models:
  - Products become services
  - Crowd Service
New **rules of engagement**: Customer experience redefined
Customer experience: *What customers really want*

**CONVENIENCE**

**SPEED**

**RELIABILITY**
“New customer engagement methods are needed that are simpler, faster, and more satisfying.”

Source: Constellation Research - The Digital Transformation of Back-End Customer Experience by Dion Hinchcliffe
Digital **beats phone:**
Dramatic shift in **channel preferences**
Can you text me when dinner is ready?
Over the next five years, phone conversation with customer service reps will make up merely 12% of service interactions – down from 41% today.

Rise of the machines: Artificial intelligence (AI) and machine learning
Rise of the machines

Implemented or plan to implement

- Have implemented in 2017
- Will implement in 2018
- Will implement by 2020
- No current plans (as of end of last year)

Source: Gartner Survey Analysis: Customer Experience Innovation 2017 — AI Now on the CX Map
Providing faster customer service with **AI-based service ticket management**

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**CuRT IS AWESOME**

“**Customer Request Tracking**”

Dear CuRT,

I’ve been telling the world about you for a long time. Honestly, I dreamt of you sometimes and I have been looking forward to this day totally thrilled, since it was not always clear you’ll make it. My wife likes you, also my son does. But most important is, that your new colleagues like you. You will start working in the Water Chemicals department at BASF. #WeLoveWater! Amazing people who can’t wait to welcome you to your new job. We all are happy, that it finally just took 10 weeks for you to join this wonderful team of people. I have no doubt, that you are the best choice for the challenges ahead…

SFR’s customer support bot handles 20% of all requests
“Chatbots expected to cut business costs by $8 billion by 2022”

Karen Gilchrist, @karengilchrist
Published 9:01 AM ET, May 9, 2017
Everything is connected:
The Internet of Things (IoT)
“IoT will grow to over 20 billion connected things by 2020.”

Source Gartner
Using IoT sensor data for **predictive maintenance and service**

Know what tomorrow will bring, today.

The powerful combination of trend recognition, remote diagnostics and predictive maintenance makes unpleasant surprises a thing of the past.

Cutting customer’s unplanned downtime by 60%
New **business models**: Products become services
Forget the compressor:
Sell the air
Crowd service in the “gig economy”

No more waiting for the cable guy

• 80% get onsite support within 1 hour
• Average rating 4.71 out of 5 stars
• Net promoter score went up by 15 pp
• Churn was reduced by 20%
Intelligent Service with SAP Service Cloud

ASSISTED SERVICE

SELF SERVICE

FIELD SERVICE

SAP SERVICE CLOUD
Our Vision for **intelligent customer service**

**CUSTOMER SERVICE & SUPPORT**

- **Self Service**
  - Virtual Agents/CX Chat Bot(s)
    - Transaction
    - Account
    - Support/Complaint
    - ERP/CX
    - KM/Service
    - Intelligent "IVR"

- **Assisted Service via Contact Center**
  - Virtual Assistant for agent guidance
    - Intelligent Routing
    - Ticket Intelligence Categorization, Priority
    - Product recommendations

- **Field Service**
  - Virtual Assistant for technician guidance
    - Intelligent Scheduling
    - Intelligent Service Networks
    - IoT/IAN
    - Predictive Maintenance
    - Parts recommendations
  - Field Service Technician (internal/external)

**Robotic Processing Automation/ML**

**Sentiment Analysis / Emotion Detection / Speech to text**

**Next Best Action / Intelligent Workflows & Case Management**

**Supporting Technologies**
SAP Service Cloud AI/ML Solutions/Scenarios

AVAILABLE

Ticket Intelligence
Predictive Maintenance

Chat Bot Platform/Conversational UI (Recast.ai)

IN PROGRESS

Solution Intelligence

Virtual Assistants & pre-configured Chat Bots

PLANNED

Field Service Intelligence

Account/Customer Intelligence

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# SAP Service Cloud: ML Capability Matrix

## Ticket Intelligence
- Ticket Categorization
- Similar Tickets
- Predictive Routing

## Solution Intelligence
- KB Article Recommendation
- E-Mail Template Recommendation
- Recommended Responses

## Virtual Assistants
- Virtual Agent
- Virtual Assistant
- Supervisor Assistant

## Account/Customer Intelligence
- Product Recommendations for Cross-Sell
- Product Recommendations for Up-sell
- Account Health Score

## Field Service Intelligence
- Predictive Maintenance
- Scheduling Optimization
- Parts Recommendations

### ML Business Solutions

- ML Building Blocks (NLP, Speech to Text, Translation ...)

## SAP ML Platform (MLF, PA, 3rd Party)

## SAP Analytics Cloud

## SAP Datahub
Intelligent SAP Service Cloud today
SAP Service Ticket Intelligence predicts ticket categories and solutions based on modelling historical ticket data.

Typical customer support ticket attributes:

- From: XXXXXX
- Subject:
- Message (question):
- Service category:
- Incident category:
- Solution provided (answer):

Historical ticket data with associated messages, labels and answers.

Prepare data
Train model
Store model

Prediction Service

New ticket arrives via email, social platforms etc. in the CRM system

Ticket category predicted, suggested answers for service agent provided

Capture feedback for re-training.
SAP Service Ticket Intelligence
For Improved Agent Productivity

- Uses Deep learning - character level convolution neural networks for ticket category classification and ticket prioritization
- Detects languages and network model works on multiple languages
- Predict customer sentiment using NLP and deep learning techniques.
- Extract Golden & Business entities automatically

Category*: Post-Purchase
Language: English
Sentiment: Neutral
Product ID: GGL 304 359
Date: 20 June 2018
Location: San Francisco

*only category is available as of 18.08. Rest of API out puts are in the roadmap
# SAP Service Cloud Ticket Intelligence Results

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Customer Engagements</td>
<td>30+</td>
</tr>
<tr>
<td>Number of Models Deployed</td>
<td>20</td>
</tr>
<tr>
<td>Number of Live Customers</td>
<td>10</td>
</tr>
<tr>
<td>Number of AI Assisted Tickets</td>
<td>5.95M</td>
</tr>
<tr>
<td>Average Automation Rate</td>
<td>69%</td>
</tr>
<tr>
<td>Average Time Saved/Agent/Day</td>
<td>40 minutes</td>
</tr>
</tbody>
</table>
Sample Value Proposition for Ticket Categorization
Reduce Cost of Service Operations

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Agents</td>
<td>300</td>
</tr>
<tr>
<td>Average Number of Tickets/Month</td>
<td>10,000</td>
</tr>
<tr>
<td>Average Time Reading &amp; Assigning Ticket Categories</td>
<td>5</td>
</tr>
<tr>
<td>Total Time Reading &amp; Assigning Tickets/Month</td>
<td>50000</td>
</tr>
<tr>
<td>Total Time Reading &amp; Assigning Tickets/Annually</td>
<td>600000</td>
</tr>
<tr>
<td>Estimated Ticket Automation</td>
<td>70%</td>
</tr>
<tr>
<td>Total Time Saved with Automation</td>
<td>420000</td>
</tr>
<tr>
<td>Total Time Saved in Hours</td>
<td>7000</td>
</tr>
<tr>
<td>Average Hourly Wage/Agent</td>
<td>$15</td>
</tr>
<tr>
<td>Total Cost Savings/Annually</td>
<td>$105,000</td>
</tr>
</tbody>
</table>

- Costs Savings are for a model company with 300 agents and 10K incoming service tickets via e-mail channel/month
- To check potential costs savings for customer, use Value Engineering Template
Categorizing and Routing through ML (Machine Learning)

Missed appointment by your service team

Taylor Jones <taylor.jones@gmail.com> 
to Customer 

12:29 AM (7 hours ago) 

Dear Sir/Madam,

Last Monday we were expecting your service engineers to arrive at our home between 8am and 12 pm.

No one came until 2pm and after calling your service desk, we were told that there are no more service appointment slots possible for us this week.

We are very disappointed as this would mean a whole week with no fridge for our family.

Regards,
Taylor Jones

[Image of SAP Hybris interface showing categorization and routing through ML]
Similar Ticket Recommendations 
Based on Closed Tickets

What is it?
Recommend top 3 similar tickets for agents to discover best practices applied on previously closed tickets

Business Problem
• No visibility into solutions applied to other tickets in similar categories

Key benefits
• Increase agent productivity without having to sort through all closed tickets
Machine Learning Model Administration
Simplified setup, configuration and deployment of ML scenarios

- Accuracy of model is visible under model table
- Customers can configure threshold for automating prediction of ML model (today only applicable for Ticket Categorization)
- Example: if confidence level is set to 80% then all predictions with confidence over 80% will be automated
- Users still have the option to change prediction value (e.g. ticket category)
- Capture prediction model feedback with implicit & explicit user behavior to improve model performance
Solution Intelligence
Improve Agent Productivity

- Knowledge connectors to SAP JAM ensures relevant recommendations based on service categories
- E-Mail Template Recommendations to surface relevant solutions based on service categories
- Works on text content across multiple languages
- In-line Translation capability to assist service agents and managers
- Product Recommendations for Up-Sell & Cross-Sell

*only category is available as of 1808. Rest of API outputs are in the roadmap
SAP Conversational AI with SAP Leonardo
Chatbot Platform (Recast.ai)

A world-class NLP and NLU API

An end-to-end bot building collaborative platform

Automated customer service solutions by industry
SAP Chatbot Architecture
Highly Scalable & Robust Multi-lingual Natural Language Processing Platform

- Best in class NLP & NLU deep learning platform with support for 12 messaging channels out of the box
- Supports Rapid Deployment in weeks compared to months with graphical bot builder framework
- Industry Accelerators for Telco, Banking & Insurance, Transportation & Utilities
- Data Privacy & Security built-in for large organizations
Virtual Agents/Chat Bots
Deflect Incoming Engagements

- Deploy chatbots for customer Self-Service and employee assist scenarios
- Leverage SAP Recast & Co-Pilot for providing a comprehensive chatbot capability within your organization
- Pre-built SAP content for SAP data sources such as JAM Knowledgebase or S/4 Orders
- Customize & Extend SAP content using SAP Chatbot platform
Blending Automated Self Service with Assisted Service
Agent Desktop with Chatbot Integration

- SAP Customer Engagement Center is available as a fallback-channel in SAP Conversational AI
- A virtual agent (chatbot) assists the customer with solutions, order status, or other information
- The conversation can be transferred (fallback) to a live agent when needed
- Agent has full visibility of the chatbot/customer conversation
- The conversation is saved in Interaction History for future reference
SAP Machine Learning Architecture
Highly Scalable & Distributed Model Training & Prediction Platform

- Data is extracted from SAP C4C into SAP Leonardo Platform (on SCP) for Model training and prediction
- Model training can be only initiated by customer via C4C Administration Settings
- Model training can take approximately 1 hr. for 100K records (actual times may vary)
- SAP Leonardo is running on the same Data center as SAP C4C
- Data is transferred using ODATA API
Field Service Intelligence

- Work ticket classification using deep learning techniques
- Estimated time to completion of jobs and scheduling optimization based on historical data
- Scheduling optimization
- Technician matching based on skills
- Parts recommendation based on service history data
**Intelligent Crowd Service**

Crowd Service helps meet customers expectation for real-time service. With the Coresystems FSM solution, you can build your own pool of technicians and rely on powerful AI tools to automatically plan service requests in real-time.

**Crowd Service Capabilities:**

- Configurable Onboarding Platform to invite partners and others to become a part of your service crowd
- Intelligent scheduling to determine the best qualified technician by taking into account expertise, location, and availability
- Crowd workers have ability to accept or reject assignments within a set timeframe
- Crowd workers are empowered with all the capabilities of Coresystems Mobile Field Service
Key Aspects of a Machine Learning Project

1. Data Exploration
   - Understanding baseline metrics
     - Opportunity to close metrics – win rate, win/loss analysis etc.
     - Service ticket metrics – ticket count distribution by categories, ticket volume trend etc.
     - Benchmarking to peers, anomaly detection, data quality detection, business process customization

2. Readiness Check
   - Understanding ML maturity
     - Business process adoption maturity or organization
     - Adherence to company specific sales and service process discipline
     - Uncovering bias and bad data quality before deploying ML

3. Model Activation
   - Ready-to-train models
     - Turnkey model activation catered to LOB departments rather than data scientists
     - Fully based on customer’s data to avoid assumptions on business process and data quality

4. Model Explanation
   - Explainable AI to build trust
     - Key factors that statistically influence targets
     - White-box of ML models for business owners and data scientists to understand model metrics

5. Model Fine-tuning
   - Last mile ML
     - Optimizing model to reach business goals by reducing false positives and false negatives
     - Additional feature engineering to improve model performance
     - Avoid model overfitting and underfitting

Automated Today
Key Lessons Learned

• **Identify & Articulate Business Problem before applying ML**
  Focus on clearly defined use-cases that impact your core metrics and spend time on data exploration

• **Clean Data beats More Data & More Data beats Better Algorithms.**
  Focus more on data quality and process maturity then type of algorithm used

• **Model is never perfect but it can be useful.**
  Optimize on business goal and try to minimize loss/false positive & negatives from model

• **Think about when ML cannot be a “black box”**.
  Explainable AI is key to build trust and make transparent the reasoning behind the prediction
Thank you.

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