



Business challenge

With the population of cognitively impaired elderly people growing, SimpleC sought to develop computer-based treatments that could improve symptoms and behaviors without drug intervention.

Transformation

Using a host of IBM® Watson™ cognitive services and the IBM Bluemix® and SoftLayer® cloud environments, the startup built a suite of innovative solutions that deliver media-based therapies using songs, photographs and recordings of familiar voices to mitigate the behavioral symptoms of dementia by triggering or restimulating memories.



Dan Pompilio
 Founder and Chief Executive Officer, SimpleC

Business benefits

60% decline

in behavioral symptoms
 related to memory loss, improving families' and patients' well-being

95% drop

in sedative drug use
 eliminating the risk of potentially dangerous side effects

30% decrease

in antibiotic prescriptions
 reducing costs for facilities and the healthcare industry

SimpleC

Advancing memory care with IBM Watson and IBM Cloud solutions

Founded in 2006 in Atlanta, Georgia, in the US, behavioral science and technology startup SimpleC provides media-delivered therapies that target the behavioral symptoms experienced by individuals living with dementia and related cognitive disorders. The nondrug, highly individualized therapies use familiar songs, pictures and voices backed by psychosocial records and support networks to improve a person's well-being and independence. SimpleC deploys its therapies in 10 states to more than 50 senior care facilities.

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—Dan Pompilio, Founder and Chief Executive Officer, SimpleC

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Caring for an aging population

According to the US Census Bureau, an average of 10,000 people will turn age 65 every day for roughly the next 20 years. By 2060, one in four Americans will be 65 and older. As the world's aging population increases, so does the number of individuals suffering from Alzheimer's disease, cognitive impairment and other dementia-related disorders. The Alzheimer's Association reports that more than five million Americans are already living with the disease, and that number may nearly triple by 2050.

Traditionally, to care for individuals with dementia-related disorders and curtail their symptoms—which include apathy, confusion, and verbal or physical aggression—the health-care industry has depended largely on specially trained clinicians or anti-psychotic medications. Such drugs, however, often have severe behavioral side effects, and skilled therapists aren't always available to provide assistance when these side effects occur. What's more, both options can prove costly and unsustainable in the long term, for families and the overall industry as well. Without new solutions, the impending wave of cognitively impaired aging adults stands to challenge the public healthcare system.

The senior housing and care industry is under pressure to improve the behavioral health outcomes of people with cognitive disorders and, more specifically, to reduce the use of prescription drugs and develop more patient-centric care models. Dan Pompilio, founder and chief executive officer (CEO) of SimpleC, elaborates, "The question has always been, 'What alternative treatments do we have?' We needed a nonpharmacological solution for dealing with cognitive impairment, and I believed that technology could help."

Treating with cognitive tools

Pompilio went on to launch SimpleC, a science-based technology company that designs nondrug, media-based behavioral therapies to engage individuals. The therapies are supported by software solutions that collect, categorize and quantify the symptoms of dementia to optimize clinical efficacy.

The startup began its journey by conducting clinical studies at the Integrace Institute at Copper Ridge, a Johns Hopkins University School of Medicine organization dedicated to treating individuals with dementia. There, it developed an innovative methodology called Care Goal, a tool that defines 2,800 variations of symptoms for cognitive disorders—up from an initial 60—to help caregivers

identify each patient's specific care requirements. The patented solution, powered by the SimpleC Symptom Derivation engine, helps clinicians build patient profiles. "The Care Goal matrix is important because it helps everyone understand a patient's needs and establish a personalized care routine based on a care goal," explains Pompilio.

The company then created Therapy Builder, a cloud-based solution that links to a database of more than 60,000 pictures, music licenses for three million songs, and the Care Goal matrix so that therapists and family members can build personalized therapy boards. For instance, if a patient worked as a teacher, the caregiver can recall images of schools or students in a classroom to help stimulate memories. The company can also use the tool to reuse and modify therapies to improve their efficacy.



Although an early adopter of cloud-based delivery, the company initially ran its production, development and data processing workloads for its solutions on platforms from two vendors. As the business grew, however, the startup needed a platform with increased scalability to manage its ever-growing media content database, better personalize therapies and build products in-house. That's when Pompilio discovered the IBM® Bluemix® platform and its suite of IBM Watson™ cognitive APIs.

"Bluemix provides a development platform that helps us take our products to the next level through agile innovation, enhanced analytics and increased automation," says Pompilio. What's more, by hosting a portfolio of Watson APIs for language, vision, speech and data insights all backed by Watson application starter kits, the platform makes it easy for SimpleC to add cognitive capabilities to new products and apps quickly as the company grows.

The first Watson API the company tested and used commercially was the IBM Watson Natural Language Classifier service, which helps normalize clinical language and industry syntax. When coupled with the Care Goal matrix, the API facilitates the new-patient intake process by understanding the intent behind statements and helping define

symptoms so that clinicians can develop a care plan. Pompilio explains, “Onboarding can be tough. It’s difficult to get background information from family members because they don’t talk in clinical terms. Instead, they say things like, ‘My dad is not sleeping well because he misses my mom.’”

In this case, instead of searching for keywords as traditional analysis technologies would, the cognitive API understands that the statement is related to care. It uses this understanding to classify and correlate the patient’s symptoms from the Care Goal matrix and return a weighted list of treatment recommendations, thereby providing clinicians with fresh insight to consider when developing care plans. For instance, whereas a clinician might deduce that the patient suffers from anxiety and prescribe anti-anxiety medication, the SimpleC solution might point to sleep deprivation as the problem and suggest a sleep care regimen. SimpleC takes the information to refine and develop the patient’s profile, which is not only more accurate and consistent than traditional profiles, but can also be developed without trained specialists. For care facilities, this ease-of-use functionality helps free trained specialists to focus on higher level tasks.

Because the company can now use Watson technology to analyze symptoms and accelerate the design of patient profiles, it has significantly extended its customer base to include a host of healthcare-related entities. In addition to serving long-term care facilities, SimpleC is also working with visiting nurse and home health service businesses, affordable care organizations (ACOs) and health insurance companies. “With Watson and our solutions, we can reach people whether they’re in their home or in a facility, such as a community. This gives us the ability to address different organizations,” says Pompilio.

SimpleC is also expediting and scaling its solutions beyond use in assisted-living facilities by systematically moving its production, development, analytics and media content to the SoftLayer® platform. “We have a team of care specialists that design and implement therapies using a platform that runs in the cloud,” explains Pompilio. “Every dimension of our work is running in the cloud.” To integrate its systems and applications, the business employs IBM WebSphere® Enterprise Service Bus software.

Over time, SimpleC has completely redesigned its platform to support Google Android and Apple iOS mobile devices and introduced a

suite of solutions, including the SimpleC Companion, an intuitive touchscreen app that promotes memory, engagement and better communication; Companion Family Connect, a tool that families and friends can use to upload photos and videos and to record voice messages that their loved ones can play on their Companion app; and Companion Clinical Connect, a solution with advanced analytic capabilities that clinicians use to monitor groups of patients. Both the Companion Family Connect and Companion Clinical Connect tools feature the Natural Language Classifier service to help engage families and caregivers.

To complement its suite of cognitive services, the startup is also integrating IBM Watson Analytics™ technology with its Symptom Derivation engine and the Care Goal matrix to analyze structured and unstructured data captured from federated electronic medical records (EMRs), caregiver or family reports, and other sources. A significant amount of data goes into SimpleC systems; the company processes and analyzes more than 750,000 transactions per day to help model patient profiles, predict service actions and generate care plan recommendations. Caregivers act on the resulting insights to adjust therapies and therapy schedules, understand future care needs and, ultimately, deliver more personalized care.

To better serve a growing population of people with cognitive disorders, SimpleC is also investing in ways for caregivers to collect vital information from unstructured data more efficiently. In the recent past, therapists used surveys to collect data. Now, the startup is combining the Natural Language Classifier API with the IBM Watson Speech to Text and Text to Speech APIs so that therapists can ask open-ended questions about patients’ health and life histories and get voice responses from the tool, eliminating the need for time-intensive surveys. The tools then translate the speech into symptom and care classifications, helping clinicians build more patient profiles faster.

“We’re changing people’s lives significantly—not just the patients’ but their families’ too. That’s what we’re accomplishing with the power of Watson and IBM and SimpleC.”

—Dan Pompilio, Founder and Chief Executive Officer, SimpleC

Recently, SimpleC completed a prototype of an application using the IBM Watson Tone Analyzer service, which takes advantage of linguistic analysis to detect the emotional tones in language. The company aims to apply the technology to track the input tones of family members or clinical users discussing and describing the care recipient.

For example, by analyzing and understanding the level of stress in a family member's or patient's voice, SimpleC gains insight into the severity of family circumstances and can adjust care plans or therapies accordingly.

Improving lives without drugs

Currently, more than 50 assisted-living facilities in 10 states are employing SimpleC media-based therapies with impressive and life-improving results. Many report a 60 percent decline in dementia-related behavioral symptoms and challenges, including agitation, irritability, depression and resistance to care. Some facilities have decreased the use of sedative drugs by 95 percent and antibiotic prescriptions by 30 percent. The therapies have also helped mitigate the kind of patient behaviors that affect others, such as verbal and physical aggression, from 35 percent down to 25 percent. Perhaps most important is that 85 percent of individuals receiving the therapies at home state they find comfort and joy in using them.

The results come as no surprise to Pompilio, who recalls working with one of SimpleC's first care recipients: an elderly man with advanced Alzheimer's disease who struggled to communicate. After learning that the patient was a former football player for Michigan State University, SimpleC built a storyboard using time-appropriate pictures, team photographs, fight songs and other memorabilia the university sent. After just a short time, the patient started speaking in partial sentences and then full sentences. The care facility described the patient as simply "having a good day" until the morning he stood up and started singing the Michigan State University fight song when the SimpleC specialist arrived. "That's when we knew our solutions were working," recalls Pompilio. "We were bringing people back." The patient's mental health and memory had clearly improved.

Part of the reason for such outstanding outcomes is the personalization of therapies to restimulate memory and improve daily life. In one case, a highly cognitively impaired woman living with her husband in an independent

living facility became embarrassed and agitated because she couldn't remember the names of friends and neighbors. SimpleC developed a unique therapy called Learn Your Neighbor that involved showing her a series of pictures of friends along with cues, such as the friend's first initial, to rouse her memory. In a short time, the patient's retention level increased from 28 percent to nearly 80 percent—a gain of almost 52 percentage points.

By eliminating drugs and their potentially dangerous side effects, SimpleC media-based therapies stand to transform not only the way people with cognitive disorders are treated, but also the lives and well-being of those individuals. SoftLayer and IBM Bluemix and Watson technologies help make this possible. "This is a market of 65 million people," concludes Pompilio. "Watson improves the quality of care that we're delivering and reduces the cost, which our customers need if they're going to reach a large population."

Solution components

- IBM® Bluemix®
- IBM Watson™ Analytics™
- IBM Watson Developer Cloud
 - IBM Watson Natural Language Classifier
 - IBM Watson Speech to Text
 - IBM Watson Text to Speech
 - IBM Watson Tone Analyzer
- IBM WebSphere® Enterprise Service Bus
- SoftLayer®

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Take the next step

To learn more about IBM Bluemix and IBM Watson solutions, please contact your IBM sales representative or IBM Business Partner, or visit the following website: ibm.com/watson/developercloud/

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