USING IT CONCEPT CARS TO ACCELERATE INNOVATION

Applied research and iterative concept development provide a vehicle for innovation and communicating a shared vision.

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Abstract: Innovation enables Information Technology to keep pace with the accelerating demand for computing power. To encourage innovation, Intel Corporation has implemented an initiative that cultivates innovation for innovation's sake. Emphasizing creative solutions rather than tangible results, Intel's IT Concept Car program encourages the "outside the box" thinking innovation requires. IT Concept Cars are based on the same premises and methods as automotive industry concept cars -- futuristic, novel, unique, and appealing vehicles used to try out new looks and capabilities. As in the automotive industry, an IT Concept Car is not necessarily fully functioning, but has just enough form and features to powerfully communicate the concept to the desired market segment and get a pulse on their interest and potential acceptance and/or sponsorship.

Key words: Information Technology; Concept Car; Innovation; Applied Research; Human Factors; idea; futuristic; vehicle; automotive industry; Usability

1. USING CONCEPT CARS TO DRIVE IT INNOVATION

In the auto industry, a "concept car" provides a gleaming view of innovation's potential. It does not represent linear progression instead it embodies a new vision beyond the next generation. The concept car's success is measured as much by the creativity it inspires as by the ultimate implementation of its details, which may significantly differ from the original concept.

Intel IT is taking steps to foster innovation as an adjunct to its mission to provide for the computing needs of Intel's more than 80,000 employees, by establishing its own Concept Car program based on methods similar to the automotive industry. Designed to promote and reward creative "outside the box" thinking, this Concept Car initiative encourages the same creative thinking within IT that drives Intel products to their position of industry leadership.

2. IT CONCEPT CAR CHARACTERISTICS

An Intel IT concept car:

- Is novel and pleasantly surprising, and has immediately apparent future benefits.
- Provides a showcase for innovative market research and product development.
- Enables an experimental prototype or demo used to research consumer reaction, acceptance, and feedback.
- Signals a significant paradigm shift rather than an incremental change.
- Does not have to be fully functional.
- Integrates and may cleverly camouflage a collection of underlying technologies via intuitive, apparent human interfaces and blended environment.

An IT concept car differs from a research project in duration and focus:

- A concept car has a quick turnaround, often one quarter or less; funding and purchasing processes are streamlined. The emphasis is on the idea and the process.
- A research project is long-term, sometimes a year or longer, and follows a much more formal plan. It typically has a much broader scope, and emphasizes the result.

3. TAKING THE IDEA TO REALITY

Several artifacts or outputs apply to IT concept Cars, and depending on the nature of the concept, not all of these will be created:

- Annotated sketch of idea to see if the concept makes sense
- Storyboards or more elaborate drawings and scripted descriptions to further define the concept
- Model or Mockup that enacts the story board
- POC Demo that is not fully functional but can be used to gather hands-on feedback / inputs

- Tradeshow Exhibit Quality Demo
 - posters, handouts, well-scripted demo
 - internal focus, small intimate settings
 - some well coordinated external venues
- Whitepaper collateral documenting lessons learned, usefulness, etc.
- Videos (web or VHS) that show use of the concept car, especially important for large physical concept cars that are not highly portable – but also serve as a permanent visual record

Limited production usage is not considered to be a concept car phase, but a concept car could transition to this, if successfully handed off to a technology development or implementation group.

The lifecycle for an IT Concept Car and how it maps to the artifacts above is described next.

3.1 Proposal creation and sponsorship

Anyone with a good idea can propose an IT concept car by submitting a completed IT concept car proposal form. In the proposal, the submitter briefly describes the concept, problem statement, benefits, usability testing plan, and can include the annotated sketch or illustration. The proposal also includes a bill of materials and the estimated cost and timeline. If a person with an idea does not want to build out his or her concept car to completion, a process is in place that seeks to find another person to work with the idea's originator—the prime objective is to encourage creative thinking, not to inhibit it with an overwhelming process.

3.2 Approval and funding

The proposal is reviewed and responded to within two weeks, either with approval, or with a request for changes and/or more information. A proposal might not get approval if the idea is not novel, or if the idea is out of scope of the Concept Car program, e.g., a limited production pilot.

3.3 Building out the Concept

Upon approval, the Concept Car owner begins the process of building out the concept via streamlined purchasing processes, and assisted by an internal contracting group if desired. This group has skilled resources for project management, storyboarding, design, engineering, development, and usability testing.

During build, the storyboarding, design, and development activities take place. Some concepts may involve hardware components that require some engineering to assemble them into a POC demo. In software oriented concepts, iterative design that progresses through storyboarding and interactive software mockups help to evolve the concept. Some concepts also include a physical setting or space.

3.4 Methods sharing, communication, and exposure

A concept car “community of practice”, CoP, meets weekly to exchange concept car experiences, best known methods, prepare for upcoming events, and brainstorm new ideas. The program office has visibility to both internal and external opportunities for showcasing the Concept Cars and obtaining user feedback.

Example events where we have taken Concept Cars include:

- CTG Country Fair, an Intel internal event including posters and demos from Intel product and research groups, including IT
- Intel Developer Forum, an international external forum with an exhibit hall that includes Intel products and other commercial high tech vendors.
- IT Innovation Center, a world-wide collection of Intel IT spaces that include lab space, showcases for posters and demos, and digital conference room areas.

3.5 Usability Testing and User Feedback

By partnering with the IT Usability Design group, we have gained some expertise and common methods for usability testing across concept cars. The types of methods that we use include surveys, focus groups, interviews, observation, and heuristic analysis of a POC. Additionally, whenever we show a concept car at event, we get feedback from the audience on usefulness, usage scenarios, benefits, ideas for extensions and enhancements, and offers to test drive the concept at a later date. Following the event, the CoP discusses and documents this feedback in a post mortem.

3.6 Capturing and reporting key learning’s

Concept car owners document what they learn so that others may benefit from their experience. The IT Research Core Team reviews concept car results and may approve further publication and additional follow-up research. Concept Car information is made available to Intel employees on an internal website; some will be presented the outside world in the form of

white papers, demos, videos, and case studies. At least 2 Concept Cars have been captured as intellectual property candidates with 1 in the patent application process.

3.7 Completion and transitioning to the next phase

Concept cars are temporary. Some will be discarded after the study; others will be enhanced or even put into production. When the concept car is complete it is made available in virtual and physical “showrooms, such as the ITIC” so that others may experience the concept and benefit from its learning’s. When we bring concept cars together in showrooms, we can also demonstrate how they can be used individually and together in different business scenarios.

4. IT CONCEPT CAR EXAMPLES

4.1 Collaboration Vision

The Collaboration Vision was developed by the cross-functional Virtual Collaboration Research Team. For over 2 years they had been trying to paint a compelling powerful vision for virtual team collaboration, and when they decided to build a Concept Car, they found the vehicle to do it! The vision was featured at the 2003 IT Strategic Long Range Planning and Product Line Business Plan events where it inspired a 3 year program to drive towards the vision.

Unique characteristics of this concept car include the ability to see all “my” multi-team activities in one place, work without time and location boundaries, interact expressively with remote collaborators, and move effortlessly among applications and team spaces.

Usage scenarios include: Meet in real time across space and know who is participating, where they are and their time of day. Work asynchronously on a shared document or project tasks, while tracking progress. Coordinate responsibilities across projects and meetings, and manage diverse tasks.

Data from an Intel virtuality survey of 1264 employees supports the vision showing that: 2/3 employees multi-team (3-10 teams). Mobility and lack of shared practices and structure negatively affect performance while performance correlates positively to sociability, expressivity, and structure.

Figure 1. Virtual Collaboration Vision Concept Car

4.2 Senseboard

Senseboard is an Intel IT Research “Concept Car,” identified through IT’s partnership with MIT Media Lab’s Tangible Media Group (Professors Hiroshi Ishii and Rob Jacobs). It is a special purpose electronic whiteboard that uses a sticky note metaphor, enabling users to physically manipulate and organize ideas while freely brainstorming and creating project task maps.

Figure 2. Senseboard: Electronic Sticky Note Whiteboarding

The primary features of Senseboard include: tactile interaction / involvement, saving session output electronically for future reference and remote participation in the group activity using a web interface that also supports audio/d video “social” interaction. Our research had the goal to explore usability and usefulness of this collaboration environment in both

virtual and co-located team settings. When we took Senseboard to the Spring 2002 Intel Developers Forum, it inevitably elicited several new, beneficial usage models and scenarios in business, academic, and even home domains.

4.3 BACCRoom

The Intel BACC Room is a collaborative environment based on research and technology developed at the Center for Integrated Facility Engineering (CIFE) located at Stanford University, using multiple connected (most commonly 3) SmartBoard™ systems. An example for this concept helps illustrate its value: During review of major construction projects, status is tracked for many things - cost to date, cash flow, schedule status, facility status, etc. The Intel BACC Room facilitates this by showing many of these elements and their relationship over time! Suppose you have three BACC Room systems, with the project schedule on system 1, the current 3d model view of the facility on system 2, while system three shows the cost of the project to date. BACC Room adds the “glue” to synchronize the 3 views over time. As you move to a new date on the schedule, systems 2 and 3 auto-magically adjust to display the associated completion level for the 3d model view and cost for that new date in time.

Figure 3. Intel BACC Room Collaboration Environment

Additional uses for the Intel BACC Room are:

- Outline work review, design review
- Training
- Maintenance
- Remote scenarios for all the above!

4.4 Intelligent Dialog Interfaces

Intelligent Dialog Interfaces is a project to develop applications of speech interfaces and conversational systems in order to (1) assess the maturity of these technologies as natural user interfaces to computing; (2) assess ROI of conversational interfaces to prototype applications and report to the IT community; and (3) identify the most pressing research questions based on prototype deployment and inform the research community. The project is funded by the IT R&D Council and is in collaboration with Intel funded researchers at the MIT Media Lab and the Spoken Language Systems group at the Laboratory of Computer Science. Two application domains will be explored in the first year: services for Intel manufacturing technicians and Intel employee services.

Figure 4. Mobile Dialog Interface for Technician in the Factory

4.5 Instant Meeting Server

Attendees at business meetings held at off-site facilities frequently feel out of touch with the office during the meetings. The hotel may provide a wired broadband connection, but unless IT support staff is provided, few presenters could manage the tangle of network hubs and cable required to provide wired connections to all attendees. While some hotels may provide even wireless LAN connectivity, typically each attendee is required to go through a web based authorization process and is isolated from other attendees while on the network. Instant Meeting Server provides easy set-up of a self-contained, portable wireless LAN for meeting attendees to share a broadband internet connection and local resources such as a printer and a notebook-based server providing shared document folders. Figure 5 shows the network configuration. Figure 6 shows the portable case. It has been used at over 8 offsite seminars, conferences, and/or training events. Figure 7 shows an example of use as an Internet Café during breaks at a CIO conference.

Figure 5. Instant Meeting Server WLAN and Shared Resources

Figure 6. Instant Meeting Server Portable Suitcase

Figure 7. Internet Cafe using Instant Meeting Server

5. LESSONS LEARNED

Through our research experiences, we have discovered that building IT Concept Cars help us to:

- Leverage longer term investments by harvesting and applying research from universities
- Increase our understanding of the desired end user experience and emerging usage models by applying design for usability principles and common processes for capturing user feedback across all concept cars
- Connect people to identify new ideas and synergies among IT concept cars through our weekly “community of practice” forum
- Tell our story through demos and exhibits, generating valuable feedback and more ideas

6. CONCLUSION

Some IT concept cars will evolve into functional, productivity enhancing tools; others will inspire further innovation in areas that may not have otherwise been considered. Regardless of their ultimate fate, the process of conceiving and implementing these concept cars energizes the creative spirit within Intel, enabling the innovation that will drive IT into a new paradigm: delivering proactive solutions that anticipate needs before they arise.