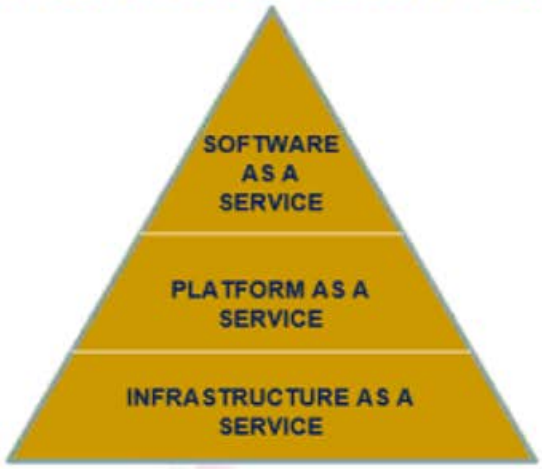
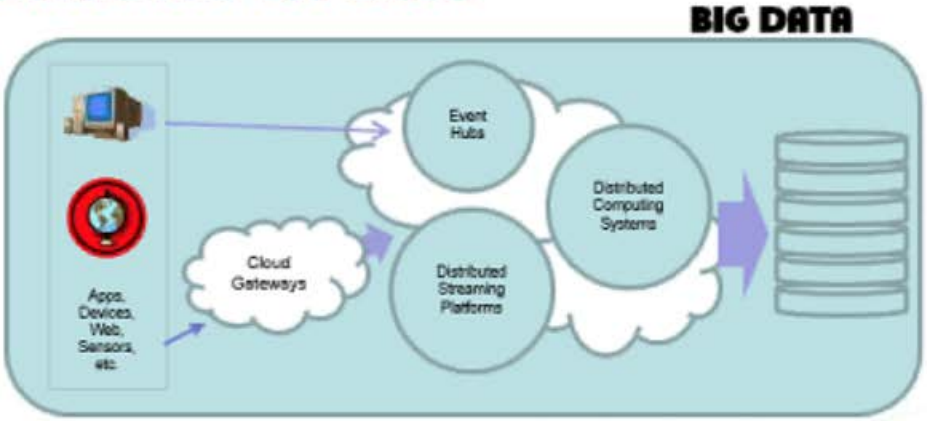
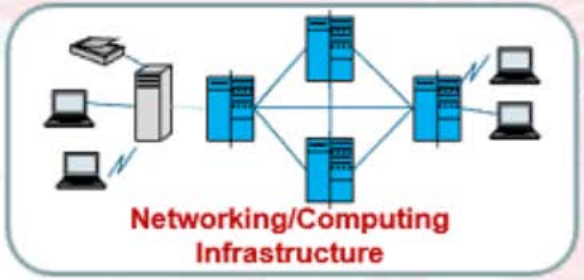
Various advancement areas







Technology Stack

- Languages
- Content Management Services
- Content Delivery Network
- Caching
- Applications
- Databases
- Operating Systems

For example, a well known open source electronic platform provides a tool which uses the principles of programming language to enable writing in a higher level language, uses the principles of compiler that turns the code into object files (machine readable instructions), and a linker to combine the object files with libraries.

Principles of programming languages, compiler, linker, and Graphical User Interface are some of the scientifically determined facts and principles within the tool-set.

Similar evolution can be seen in technologies associated with Web systems, Information systems, micro-controller based systems, relational databases, No-Structured Query Language (SQL) databases, distributed storage and retrieval etc.

The most significant underlying key variables are:

programming languages, compilers, linkers, Interface

Technology or Knowledge Base Level:

Activity #2-1: Technology vs. features (Fiscal Year 2017)

Methods of experimentation:

Method	Experimentation Performed
Analysis / simulation:	147 alternatives
Trials:	13 runs / samples
Physical prototypes:	7 samples
Lines of code:	14800 Lines of prototype code

Slide 14:

Companies produce various products and services using technology. SR&ED looks at the advancement in technology necessary to deliver the new or improved products and services. Therefore it is important to distinguish between technology and product.

Often the name of the product, process, or device is also used to identify the technology.

The distinction is:

Product, process, or device conveys feature, functionality, capability, etc.

Technology is about the knowledge of how the constituents embodied within the product, process or device, function to deliver the feature, functionality, capability, etc.

For example: Web information system publishing tools that also serve as document management and storage systems come with features, interfaces, application program interfaces (APIs) and tool-sets to build information systems.

Results:

Conclusion:

Slide 15:

Understanding the capabilities and limitations of such systems for building an information system, use of their API/interfaces to develop an information system, or information about their features and functionality are about a product.

On the other hand, knowledge of the internal workings of such systems and how inter-relationships produce, influence, and impact the features, interfaces, APIs, tool-sets etc., are related to the technology.

Significant variables addressed: compilers, Interface, linkers, programming languages

Documentation:

- Offline Documents: Supporting documentation

Uncertainty #3: Other areas

Slide 48:

Technological advancements in software development projects can involve:

New or improved techniques and methods in computing to store, search, process, and manage vast collection of data (big data). Typically undertaken in Universities and large research labs.

Advancements necessary in support of software technology stack or tools.

Advancements necessary for new or improved infrastructures like internet driven Cloud and distributed computing.

Advancements necessary to support scaling, reliability and availability of software based systems.

Advancements in other technology areas like vision and medical imaging, video transmission, telecommunication (voice), automation, controls, etc.

The most significant underlying key variables are:

improved infrastructure options (unresolved), scaling, reliability & availability options (unresolved), vision design options (unresolved), technology stack or tool designs (unresolved), big data methods (store, process, manage) (unresolved)

Technology or Knowledge Base Level:

Activity #3-1: Ineligible activities (Fiscal Year 2017)

Methods of experimentation:

Slide 27:

We will now look at a few examples to illustrate common misconceptions about technological uncertainty. The first example is to emphasize that absence of a capability does not equate to a technological uncertainty.

A company wants to build a new version of their client server mobile application. The older version of the application worked in conjunction with a well known Enterprise Server that offered server side Push. The new version of the application was required to work in setups where the Enterprise server could not be used.

In client server applications, the server responds to client requests. With a server side Push service, client applications can receive information from their servers even if they did not initiate a request.

Results:

Conclusion:

The company cannot claim the lack of availability of the Push capability from the Enterprise server as a technological uncertainty for its work to build some form of a Push service.

The company has to identify a limitation of technology that is preventing the development of its own Push service.

1711 - VOIP - improve SIP interaction	
BENCHMARKS	**ACTIVITIES BY YEAR**
Internet searches: 32 Articles Patent searches: 5 patents Competitive products or processes: 17	2017
Potential components: 8 products	'1-1
Queries to experts: 5 responses	Activity 1
OBJECTIVES	**RESULTS**
Call continuity: 99.9 % uptime	94
UNCERTAINTIES & KEY VARIABLES	**CONCLUSIONS**
1 - TU beyond SP	
Information theory	Y
Network protocols-TCP, SIP, RTP	Y
VOIP protocols - setup, progress, teardown	Y
	METHODS
Analysis Trials Prototypes Lines of code	
	COSTS
Hours	170
Materials $	
Subcontractor $	