The MapPlace
Using Web-Based Mineral Exploration Data as an Environmental Tool

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Within the realm of environmental services, whether related to contaminated sites remediation or environmental planning, the job of the professional environmental consultant is often a hectic one. Many projects — in particular, preliminary environmental site assessments and investigations (Phase 1 and Phase 2) — are characterized by short time frames and tight budgets. This means that any tool that can potentially be used to save time and money is an asset to both the professional geoscientist or engineer who conducts the work and the client.

One such tool has recently been used to save research time and provide access to a database not generally available in the offices of most large consultancies — let alone an independent operator working in rural BC. This resource is the MapPlace, a BC Ministry of Energy and Mines internet site that provides efficient, speedy and free interactive access to government geographical, geological and mineral exploration datasets that would otherwise require a small, well-financed library.

Originally designed by the BC Geological Survey as a tool for mineral explorationists, the service has also proven to be an excellent resource for agencies and stakeholder groups who require mineral potential inventories for purposes ranging from public land use planning to treaty negotiations. As the MapPlace website continues to evolve, it has also — somewhat unexpectedly — become an ideal geological-based reference tool for professional geoscientists and engineers involved in environmental investigations and assessments.

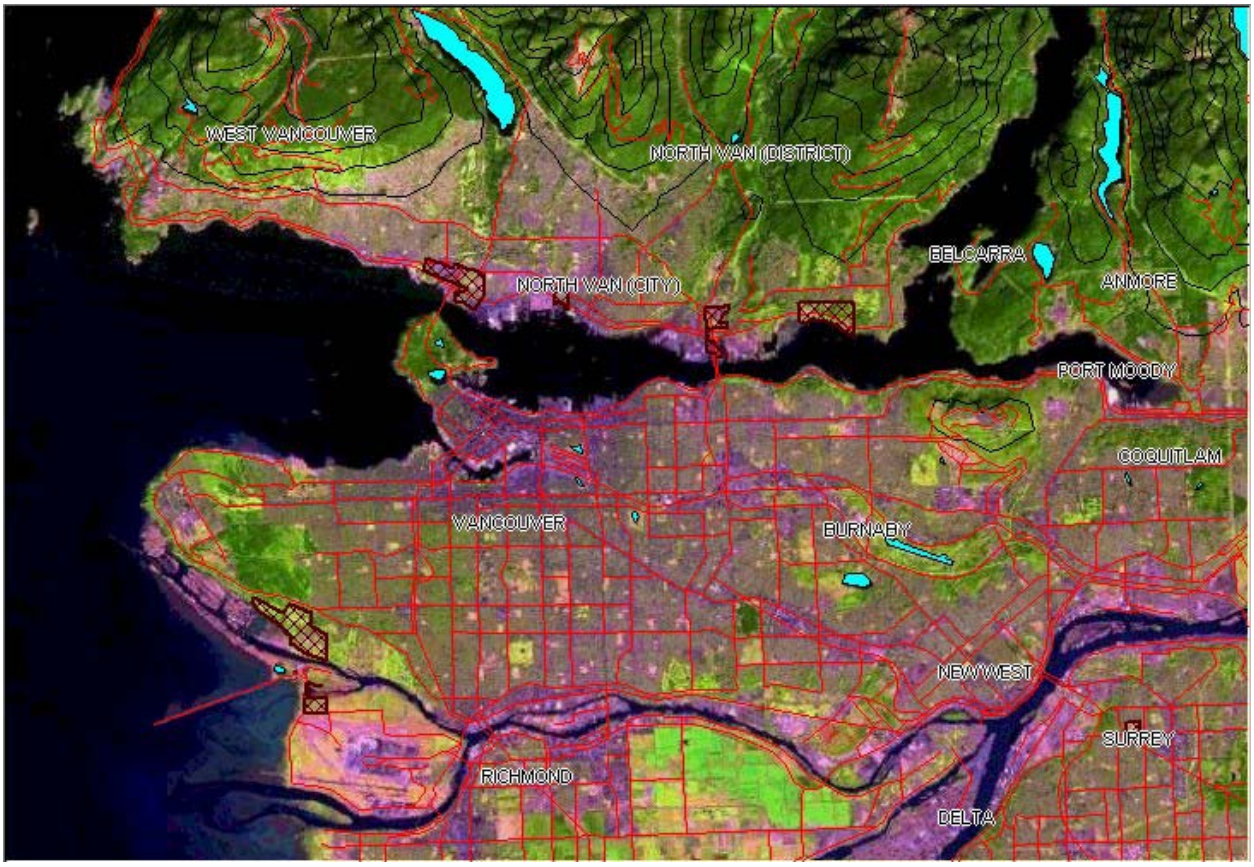

Figure 1: **MapPlace topographic map of Vancouver showing city, municipal and Indian reserve boundaries.**

Features of the MapPlace

The brainchild of Ward Kilby PGeo, formerly of the BC Geological Survey, the MapPlace (www.em.gov.bc.ca/mapplace) is an award-winning, web-based system that provides the mineral exploration industry, land use planners, government agencies and the general public with free access to BC mineral exploration information in a dynamic map format.

Its development was linked to the 1997 release of AutoDesk's MapGuide™ software, which displays, retrieves and analyzes vector and raster based map information over the internet and can be downloaded free of charge from the Ministry's website.

The MapPlace provides interactive map access to most of the BC Ministry of Energy and Mines geospatial data holdings including bedrock and surficial geology, metallic and industrial mineral potential ranking, regional silt and water geochemical surveys (RGS), mineral occurrences (MINFILE), assessment reports (ARIS) and mineral title locations.

The user can produce user-defined map views by combining these themes with other georeferenced datasets and related map based information (vector and raster based) including administrative boundaries, topographic features (TRIM), digital elevation model (DEM) shaded relief, satellite (LandSat) and aeromagnetics.

Final maps can then be printed or pasted into common graphics packages. In addition, many of the features that can be displayed on the MapPlace are linked to supporting database tables, thus allowing the discovery, retrieval and reporting of valuable attribute data linked to individual map objects. For some themes, clicking on an object links to a separate web site such as MINFILE or Mineral Titles, allowing further search and retrieval capabilities.

The power of the system is that it provides some near-GIS options such as buffering and retrieving attributes for polygons or points. With the MapGuide Author software, the user has nearly complete control of how data is displayed, thus allowing further customization of the resultant map. The BC Mapper application on the MapPlace site also allows users to input their own data on top of existing MapPlace themes by heads-up digitizing of polygons, points and lines on screen.

Using the MapPlace

The MapPlace website was developed around several off-the-shelf software packages including Autodesk MapGuide™, Allaire ColdFusion™, Microsoft Access™ and the usual web server software. Databases handle all the tabular information associated with the site. ColdFusion is used as a web database manager, report writer and sophisticated web toolkit. MapGuide Server, Author and Viewer software provide the map displays, GIS functionality and development environment for this style of web presentation.

Several of the datasets displayed on the MapPlace, including the tectonic assemblage map geology, reside on MapGuide servers at Natural Resources Canada. This integration of data from different sources and custodianships is one of the most powerful features of distributed systems (Figure 2).

After accessing the web site and downloading the free viewing application software provided (online tutorials, interactive demos, help functions and FAQs are also available), the user is presented with a host of choices under Available Maps (found under Contents). With the most appropriate starting point being the BC Geological Survey geology map, it is then a simple task to access the required maps.

The first screen shows a map of BC divided into 1:250,000 scale NTS maps; a zoom-in feature allows isolation of the general area desired. As the required scale is reached, features such as contours, rivers, lakes, geology and nickel geochemistry can be "turned on," with the level of detail dependent on the scale. The map produced can then be printed with the desired title, legend, format and scale.

MapPlace and the Environmental Consultant

How can the MapPlace assist the environmental project manager? Pottinger Gaherty Environmental Consultants (PGL) of Vancouver has found the various datasets available on the MapPlace useful in characterizing the environmental settings of rural, and especially remote, sites for which data are often not easily available; for example:

- The regional geochemical survey (RGS) database has been helpful in determining potential natural sources of metals contamination.
- Mineral tenure data taken from the assessment report indexes (ARIS) database has been used to identify users of resource roads proposed for deactivation.
- The geographical data can provide a quick, reproducible satellite image (LandSat) map of any proposed study area in the province.
- Bedrock and surficial geology data provided on the website from a combination of digital geological maps and mineral occurrence and aggregate deposit descriptions (MINFILE) help in the interpretation of potential slope

stability hazards. They also provide a basis for the development of a preliminary hydrogeological model of an area.

- Best of all, the MapPlace does all this in about the same amount of the time required to find (with luck) the right 1:50,000 scale topographic map in the office flat file.

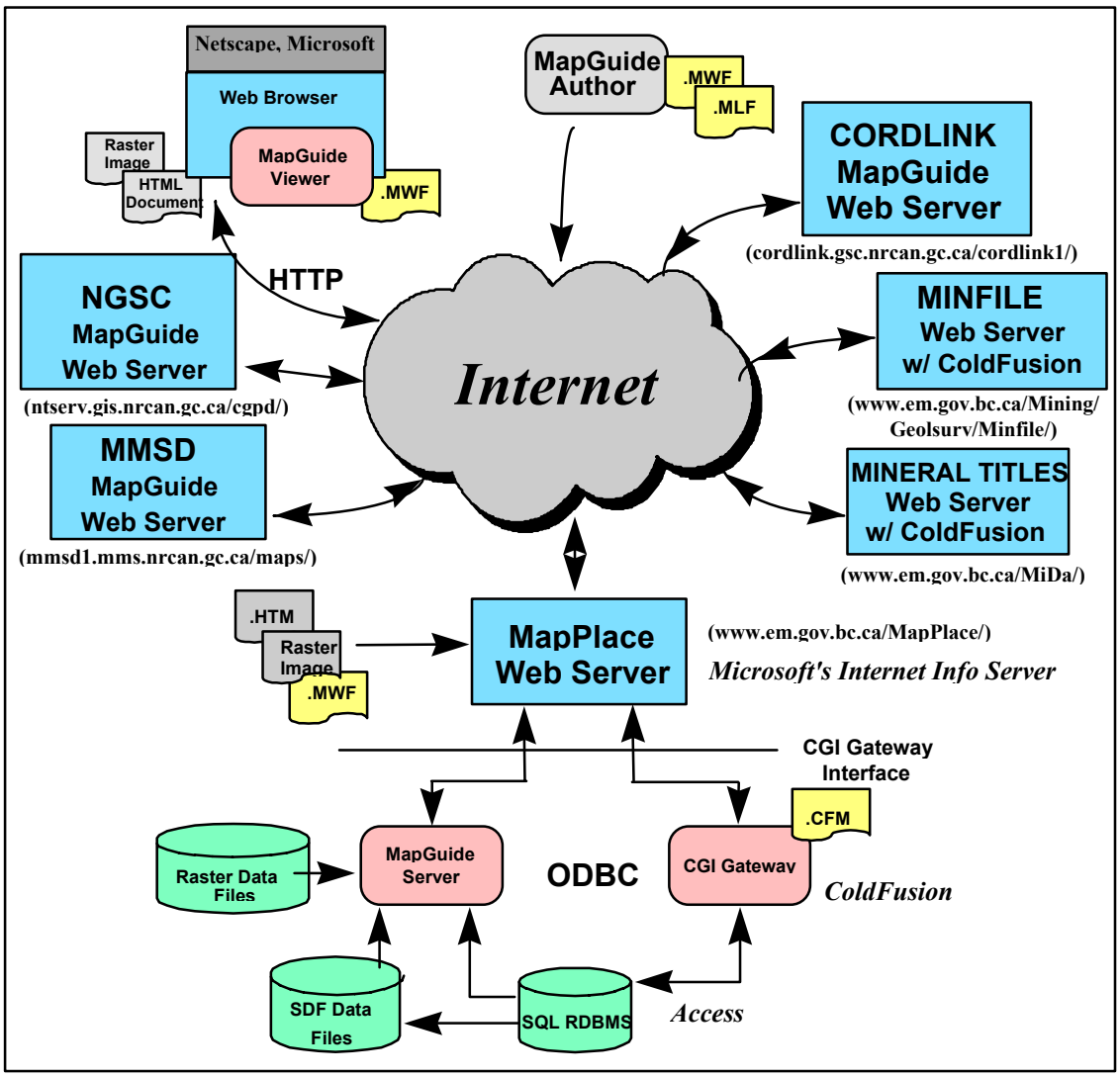

Figure 2: **MapPlace components.**

PGL has conducted a variety of studies for both industry and government clients that have required preliminary investigations for potential contaminants (Phase 1), often as part of a single phase of work, on numerous rural to remote sites spread over a broad geographic area. Each specific site requires a description of the hydrogeological setting, but it is neither practical nor cost effective to send a hydrologist to every site.

However, using geological data derived from the MapPlace combined with other collected data (site investigation field notes and photographs, interview notes of onsite personnel, available well logs, aerial photographs), it can be possible to provide a technically sound and very cost effective preliminary assessment of the hydrogeology of every site investigated.

Prefield Compilation: Examples

Using the MapPlace as part of the prefield compilation effort is especially beneficial. It allows a professional geoscientist to highlight additional features to be investigated by the person in the field (many of which require only a quick visual inspection) that might not otherwise have been part of the routine investigation.

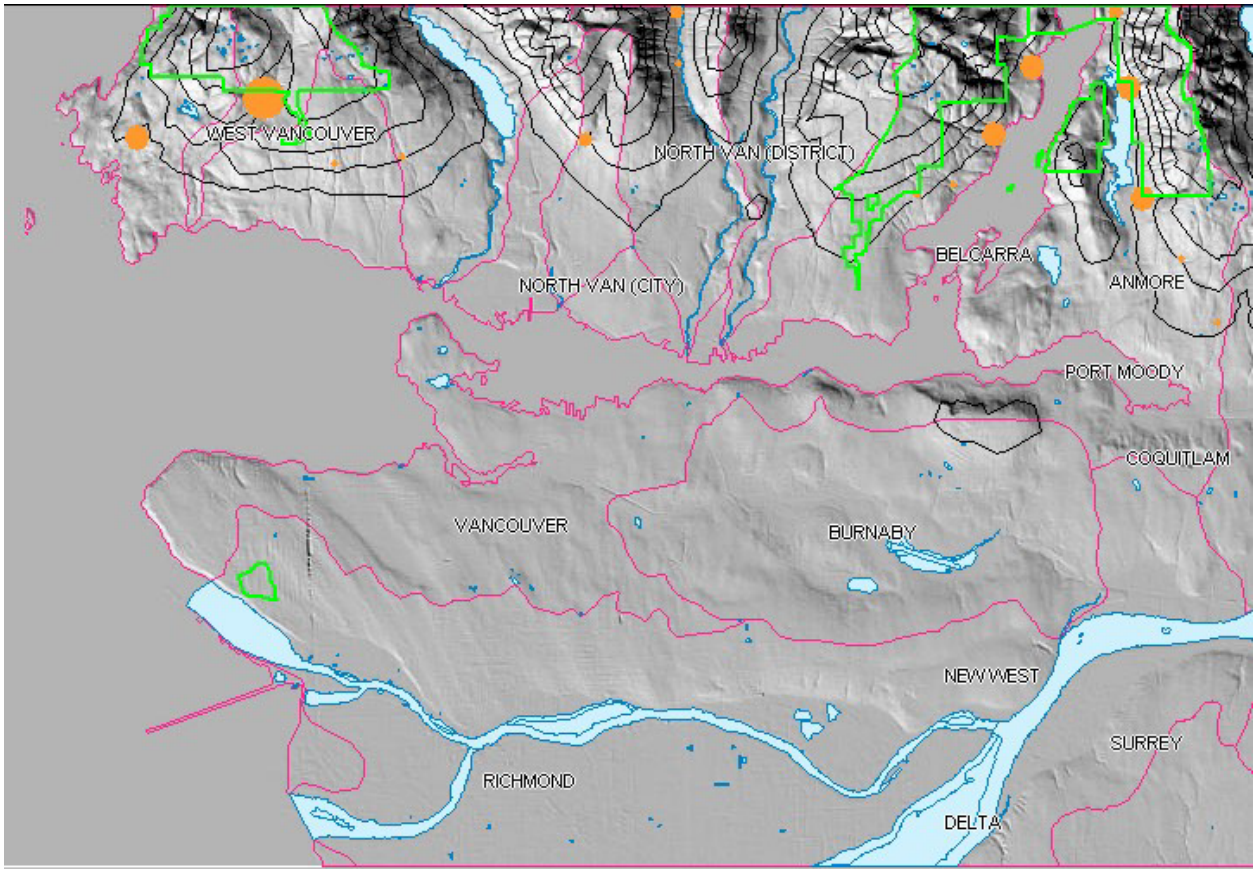

Figure 3: **Vancouver image showing contours, watersheds, copper data and park boundaries.**

An example site could be a fish hatchery. The data provided prior to the field investigation could be limited to a simple location map, legal description and site survey plan, and a couple of well descriptions from the provincial well registry located for properties in the vicinity.

Using the MapPlace, within an hour the prefield investigation file would include topographic, LandSat image and geologic maps (Figures 1, 3 and 4) reproduced in colour at the appropriate scale, along with available detailed bedrock or surficial geological descriptions. The result is a preliminary hydrogeological model based on an understanding that the site is very gently sloping, has abundant surface water, is underlain by massive granodiorite intrusives and is overlain by a blanket of impermeable, clay-rich, silty moraine greater than 5 m thick.

Another example might be a rural site with limited development and no known metal contamination sources, but one that exhibits elevated chromium and nickel levels in soils derived from alluvial sediments. Expensive analytical techniques could help determine the chromium and nickel present in sands concentrated within the alluvial beds by natural stream sedimentation processes.

By using the MapPlace, a professional geoscientist could first determine that tholeiitic basalts, often elevated in nickel and chromium, underlie the stream catchment area immediately surrounding the subject site. With plots from the Regional Geochemical Survey data, the MapPlace can provide support to the argument that the elevated metals present on the subject site are from natural sources. A plot of nickel anomalies in stream sediment samples collected by the BC Geological Survey showing an anomaly of 186 parts per million along the stream adjacent to the site could help to save significant costs and effort (Figure 3).

Conclusion

Pottinger Gaherty Environmental Consultants has successfully used the MapPlace website to the overall benefit of clients during the initial data compilation phase of many work programs. The result has been repeated positive feedback on the level of relevant detail provided — detail often not considered or reported because of a lack of easily available data.

Now operational for over four years, the MapPlace has proven itself as an efficient and effective way to disseminate map-based information, and its flexibility gives users — including professional geoscientists and engineers in the environmental field — a powerful tool for quickly building their own custom maps.

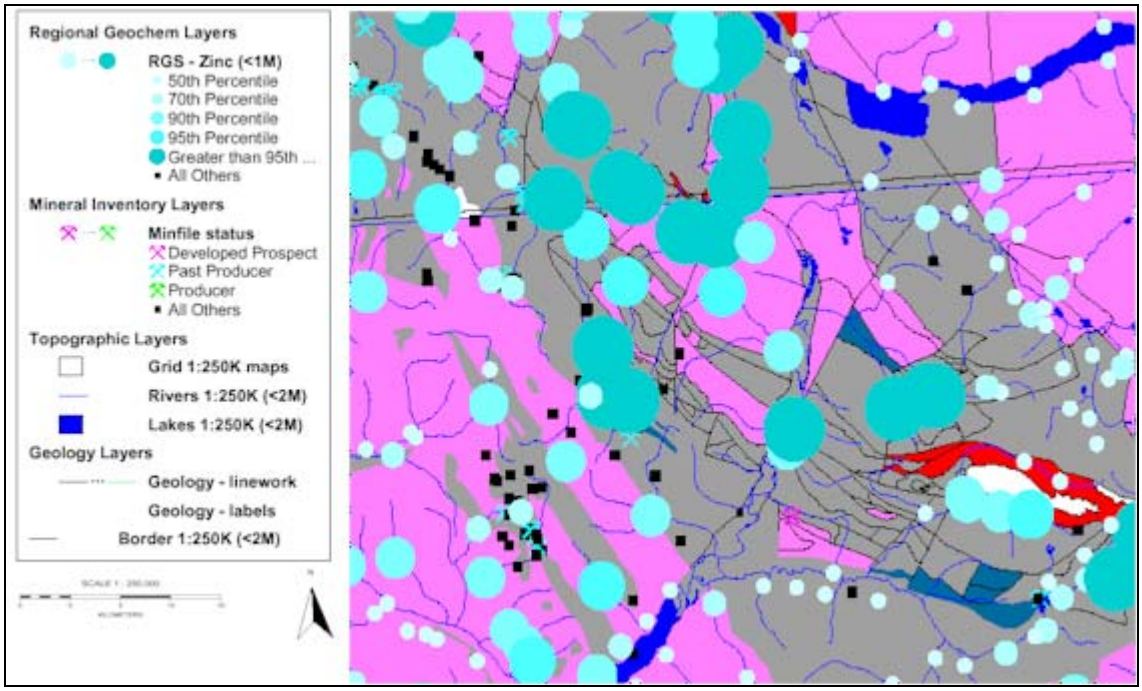

Figure 4: **Map showing geology complete with Regional Geochemistry and MINFILE mineral occurrence site locations, each hot linked to information about the site.**

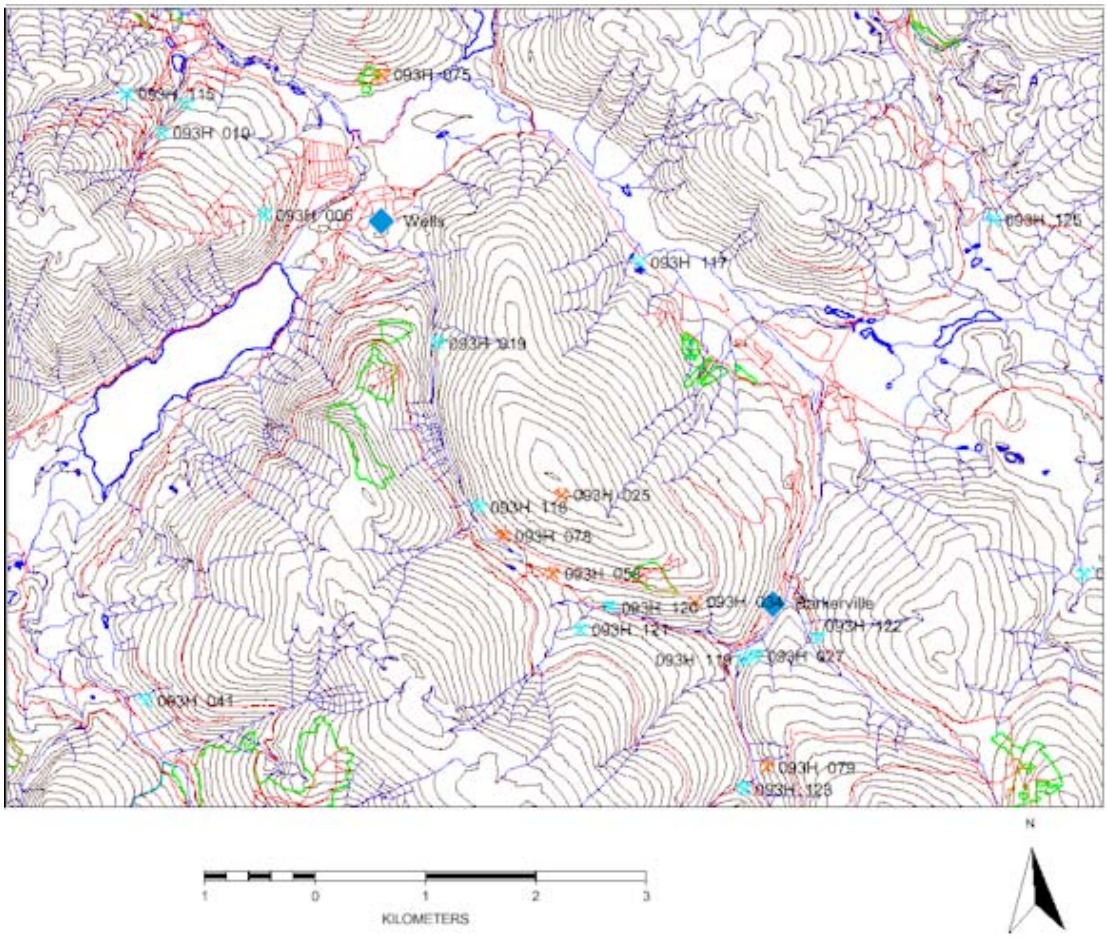

Figure 5: **Map showing 1:20,000 TRIM and MINFILE.**

References

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